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OPHTHALAS® 532 EYELITE®
AND
EYELASE* GREEN

SERVICE MANUAL

NOTE: This manual covers both the Ophthalas® 532 EyeLite® and the Eyelase* green lasers. These lasers are identical except for the labeling on the front and rear panels. All references to EyeLite® apply to both lasers unless noted otherwise.

Alcon Surgical
15800 Alton Parkway
Irvine, California 92618-3818 U.S.A.
Telephone: 949/753-1393
800/832-7827
FAX: 949/753-6614

906-5420-501 D, PART NUMBER
906-5420-001 D, TEXT ONLY

OPHTHALAS® 532 EYELITE® SERVICE MANUAL

MANUAL REVISION RECORD

DATE	REVISION	REVISED PAGE NUMBERS
05/97	A	ECN # 32465- Initial Release
12/98	B	ECN # 98200503 - i thru x, 1-1, 1-2, 1-4, 1-7, 1-9, 1-13, 2-1, 2-3, 2-5, 2-8 thru 2-10, 3-10, 5-1, 5-10, 5-12, 5-13, 5-16 thru 5-19, 5-21, 5-29, 6-1 thru 6-21, 7-1 thru 7-3, 7-5 thru 7-27, 8-1 thru 8-6, 8-9 thru 8-21, 8-23 thru 8-32
11/99	C	ECN# 99201019 - i, ii, ix, 1-6, 5-1, 5-2, 5-4, 5-6, 5-16, 5-24, 5-25, 5-30 thru 5-32, 6-4 thru 6-6, 6-13, 6-19 thru 6-21, 7-9 thru 7-27, 8-10, 8-21
11/01	D	ECN# 20013378 - Complete manual update.

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GENERAL INFORMATION

INTRODUCTION

This manual covers both the **Ophthalas® 532 EyeLite®** and the **Eyelase green** lasers. These lasers are identical except for the labeling on the front and rear panels. ***All references to EyeLite® apply to both lasers unless noted otherwise.***

The EyeLite® is a Neodymium-doped Yttrium Aluminum Garnet (ND: YAG) type laser which has been designed for ophthalmic use. LASER is an acronym for "Light Amplification by Stimulated Emission of Radiation." This laser delivers a visible 532 nm green laser beam (frequency doubled), and a visible 670 nm Diode Laser aiming beam (670 nm is an approximate value between 660-680 nm).

DESCRIPTION OF THIS MANUAL

The purpose of this manual is to provide the field engineer with the necessary information to maintain and repair the EyeLite® system. This manual is divided into eight sections as follows:

Section One-General Information
This section describes how to install the EyeLite®, and gives a general description of the EyeLite® features and components.

Section Two-Theory of Operation
This section gives a detailed description of how the EyeLite® operates starting at the system level and working down to the PCB (Printed Circuit Board) level.

Section Three-Parts Location and Disassembly
This section contains parts location diagrams along with field level disassembly procedures for the EyeLite® console. Disassembly procedures for OEM (Original Equipment Manufacturer) components are considered the property of the manufacturer and are not provided in this manual.

Section Four-Maintenance & Troubleshooting
This section contains system maintenance procedures and troubleshooting information along with listings of spares, tools, and supplies required to repair the system.

Section Five-Schematics
This section contains the system interconnect diagrams, PCB assembly, and schematic drawings.

Section Six-Parts Lists and Drawings
This section contains parts lists, cable drawings, and engineering documentation for each major assembly.

Figure 1-1
The OPHTHALAS® 532 EyeLite® Laser

Section Seven-Additional Information
This section contains miscellaneous information pertaining to this system.

REFERENCE DOCUMENTS
Although this manual provides the necessary information for maintaining optimum performance of the EyeLite®, it does not contain all of the operating procedures or functional descriptions contained in the Operator's Manual. In addition, the Warnings and Cautions in the Operator's Manual also apply for this Service Manual. The Operator's Manual supplements information provided in this manual and should be available on-site with the system.

If you have any questions or require additional information, please contact your local Service Representative or the Technical Services Department at:

ALCON SURGICAL
15800 Alton Parkway
Irvine, CA 92618-3818
(949) 753-1393
(800) 832-7827

If you are located outside the United States, please contact your local authorized Alcon representative.

CAUTION

Federal (U.S.A.) law restricts this device to sale by or on the order of a physician.

SYSTEM INSTALLATION

The system was inspected mechanically and electrically prior to shipment. If shipping boxes appear damaged, ask that the carrier's agent be present when system is unpacked. Inspect system for external damage (i.e. scratches, dents, or broken parts). If damage is discovered or if system fails any of the functional tests notify the carrier and an Alcon Surgical representative. Retain shipping boxes and packing material for carrier's inspection. As necessary, file a claim with carrier or, if insured separately, with insurance company.

NOTE: When unpacking a demonstration system, save boxes for repacking.

General Laser Room Layout

The EyeLite® must be installed in a dust-free room, and positioned so the laser beam cannot be directed toward a door, window, mirror, or reflective area. To reduce dust, avoid installing the instrument in a carpeted room. An example of a typical laser room layout is shown in Figure 1-2.

General Safety Precautions (Refer to IEC 825-1 or ANSI Z136.1)

- A laser safety officer should be appointed to supervise the installation and use of the system.
- Install an indicator light outside the laser room warning of instrument operation.
- Position the instrument so that the laser beam is never directed toward a door, window or reflective surface.
- Use a non-reflective matte finish wall paint.
- Avoid covering laser room floor and walls with carpet or any other dust generating material. This will minimize the possibility of excess grime and dust on the instrument optics, and interference with equipment cooling.
- The instrument requires a minimum of 0.5 meter of open space on all sides for proper cooling ventilation. Therefore, the system should be set flat, resting on the legs provided on the bottom of the console.
- Unauthorized use of this laser should be prevented by key removal.

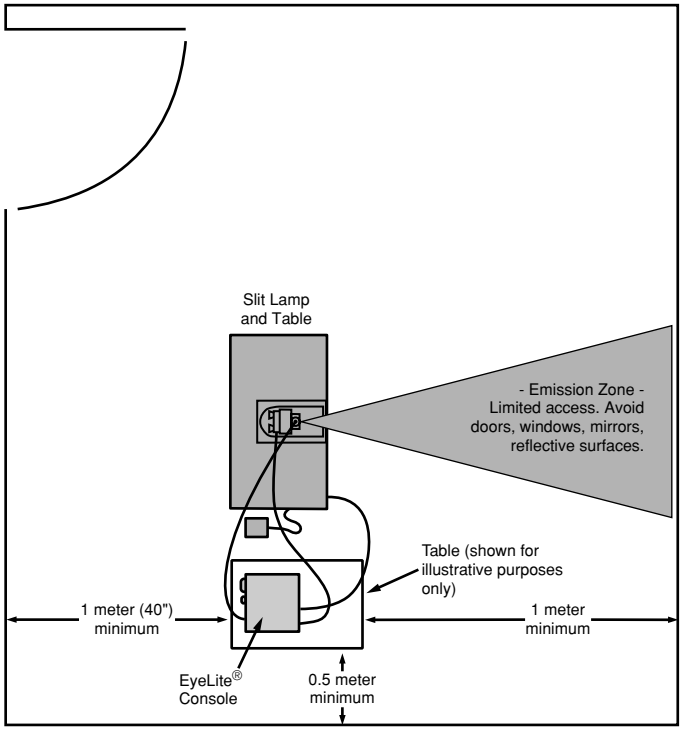


Figure 1-2
Recommended Laser Room Layout (Overhead View)

- Entrances to areas or protective enclosures containing Class IV lasers should be posted with appropriate warning signs.
- Appropriate eye protection must be used in all hazard areas. Use eye protection with OD 4 or above at 532 nm.
- A qualified technician must verify that the power plug used is properly grounded.
- The remote interlock connector should be connected to an emergency master disconnect interlock or to room/door/fixture interlocks. Please refer to Figure 1-3.

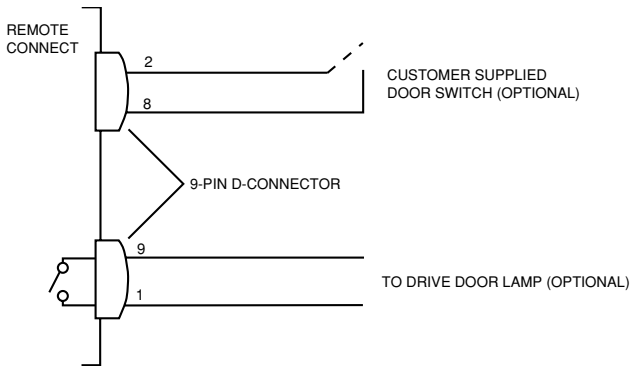


Figure 1-3
Remote Connector/Door Lamp Circuit Diagram

Utility Requirements:
Electrical requirement: The EyeLite® has an auto-ranging power supply which operates at 100-120 V and 220-240 V input ranges at 50/60 Hz. A properly grounded, standard plug is the only requirement.

Electrical Connections

CAUTION

Before turning the instrument ON for the first time after receipt of the system, wait one hour for the components and optics to normalize to avoid possible condensation that may have occurred during shipping.

Use only <HAR> power cord with a minimum of 10 Amp rating.

Before connecting the main plug verify that:

- The Main Switch on the back panel is in the OFF (O) position.
- The key is in the OFF (vertical) position, or has been removed.
- The Remote Plug is connected on the Rear Panel.

Optical Connections
Optical connections vary in relation to the procedure to be performed. Different peripherals can be connected to the output port. These peripherals are:

- Slit Lamp adaptation
- Laser Indirect Ophthalmoscope
- Endoprobe/Aspirating Probe

The procedures for connecting these peripherals are contained in the Operator's Manual.

Table 1-1
Technical Specifications

CATEGORY	SPECIFICATION
Approximate Dimensions	Width: 0.38 m (15.30 inches) Length: 0.45 m (17.75 inches) Height: 0.23 m (9.10 inches)
Approximate Weight	16.4 Kilos (36 lbs.)
Electrical Characteristics	Voltage: 100-120 VAC/220-240 VAC Frequency: 50/60 Hz Fuse rating: 250V,Single Phase 6.3 Amps Insulation class: Class I, type BF,  Intermittent use: 50% Duty cycle
Environmental Limitations	Operating: Temperature: 15° C ≤ T° ≤ 35° C Relative Humidity:10% to 90% with no condensation Storage: Temperature: -40° C ≤ T° ≤ 70° C Relative Humidity:10% to 90% with no condensation
Miscellaneous	EyeLite® complies with CE MDD requirements. Not suitable for use in the presence of flammable anesthetic, oxygen or nitrous oxide. System not protected against the ingress of water. Leakage current per IEC 601-1 is below 500 micro amps. Ground continuity per IEC 601-1 is below 0.1 ohm.

Table 1-2
Laser Characteristics

CATEGORY	TREATMENT LASER BEAM	AIMING LASER BEAM
Laser Class	IV	II
Laser Power	• 30mW to 100mW in 10mW steps • 100mW to 1W in 20mW steps with additional steps at: 0.15, 0.25, 0.35, 0.45, 0.55, 0.65, 0.75, 0.85, 0.95 • 1W to 1.7W (minimum) in 100mW steps	1mW maximum; adjustable by operator
Laser Wavelength	532 nm	approximately 670 nm

CAUTION

Canadian approval requires this supply system to be a balanced, single-phase, two-pole system. Leakage exceeds 100 mA in an unbalanced system.

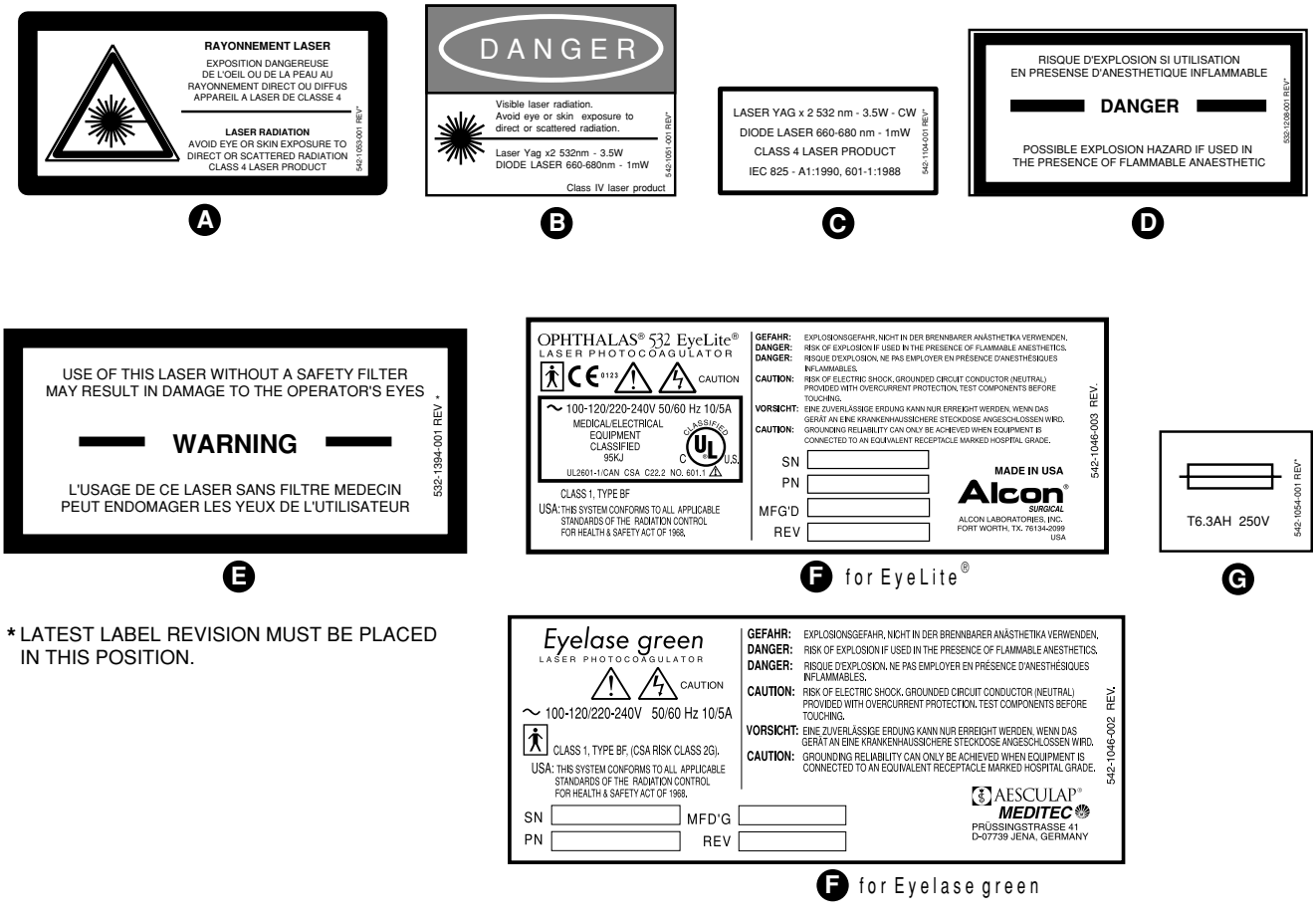
EMC Statement:
This equipment has been tested and found to comply with the limits for medical devices as specified in IEC 601-1-2:1993, EN60601-1-2:1994 and Medical Device Directive 93/42/EEC. These limits are designed to provide reasonable protection against harmful interference in a typical medical installation.

It is important to install and use the equipment in accordance with the instructions to prevent harmful interference to other devices in the surrounding area. You can determine whether or not the device is causing interference by turning it off and checking to see if the problem still exists. If this equipment does cause harmful interference to other devices, the user is encouraged to correct the interference by one or more of the following measures:

- Reorient or relocate the other device(s).
- Increase the separation between the equipment.
- Connect this equipment into an outlet on a circuit different from that to which the other device(s) are connected.
- Consult the manufacturer or authorized field service technician for help.

Environmental Issues:
Follow local governing ordinances and recycling plans regarding disposal or recycling of device components.

Universal Precautions:
Universal precautions shall be observed by all people who come in contact with the instrument and/or accessories to help prevent their exposure to blood-borne pathogens and/or other potentially infectious materials. In any circumstance, wherein the exact status of blood or body fluids/tissues encountered are unknown, it shall be uniformly considered potentially infectious and handled in accordance with OSHA guidelines.



* LATEST LABEL REVISION MUST BE PLACED IN THIS POSITION.

Figure 1-4
Warning Label Location Diagram

FRONT PANEL DESCRIPTION

The Front Panel, shown in Figure 1-5, allows the operator to control, change settings, and monitor the EyeLite®. Changes to the current system setup are acknowledged by a beep. For example: if the terminal selection or power is changed, the system will beep. A liquid crystal display shows operational prompts and error messages.

A - Emergency Switch

Depressing the Emergency Switch causes all functions, including the laser power supply, to shut down. To restore power, pull the Emergency Switch to the out position.

B - Emergency Switch Indicator LED

This indicator illuminates to warn the surgeon when the Emergency Switch has been depressed to shutdown the system. Pulling the Emergency Switch to the out position extinguishes this LED.

C - Exposure Time Display

An arrangement of four, 7-segment LEDs that displays the selected exposure time in seconds. The exposure time is adjusted by the Exposure Time Adjustment Keys. In Continuous Wave mode, all displays show dots (...).

D - Exposure Time Adjustment Keys

These up and down arrow keys allow the user to adjust the duration of the exposure time. The default setting for exposure time is 0.2 s. The exposure time can be adjusted to the following values by these two keys:

0.01 - 0.02 - 0.05 - 0.1 - 0.15 - 0.2 - 0.25 - 0.3 - 0.4 - 0.5 - 0.7 - 1 - 1.5 - 2.0 - CW

NOTE: In CW (Continuous Wave) mode, depending on the thermal load of the system, the EyeLite® may shut down prior to the footswitch being released. A message on the LCD display will indicate this condition. Therefore, it is not recommended to use exposure times longer than 2 seconds in CW mode.

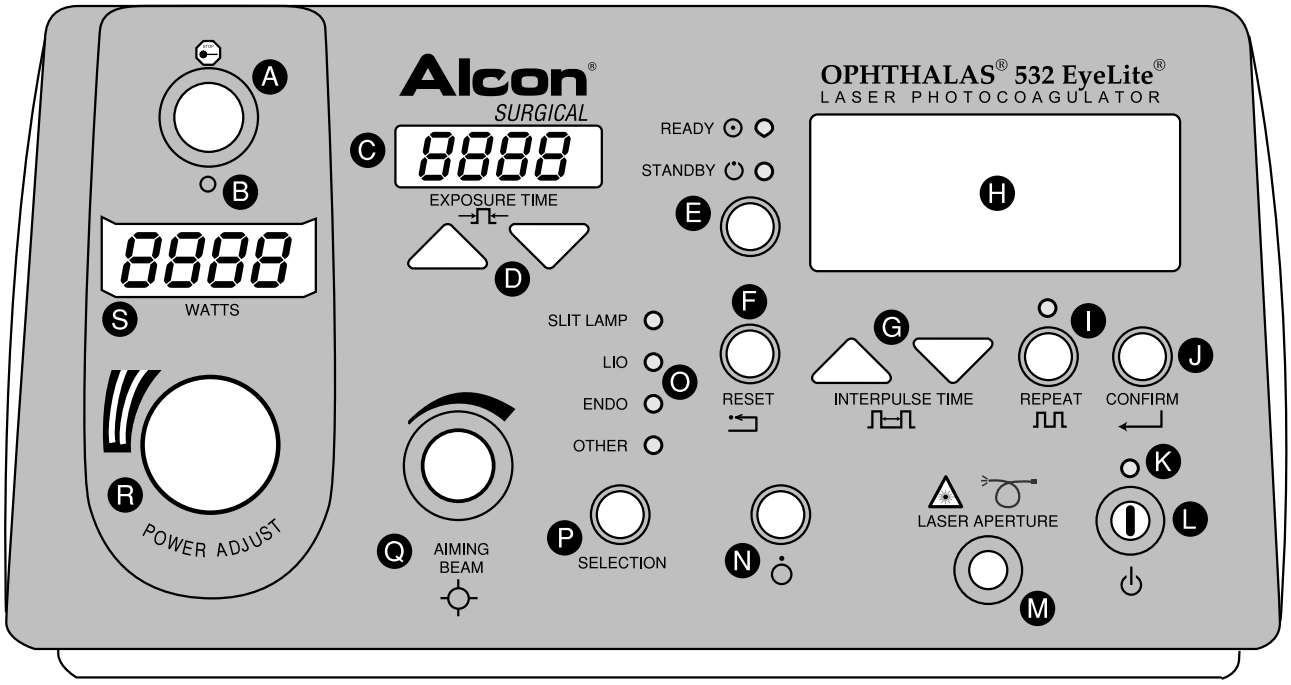


Figure 1-5
EyeLite® Front Panel

E - Standby/Ready Switch

The Standby/Ready Switch allows the user to select either Standby or Ready mode. Each mode has a corresponding LED - Green for Standby and Red for Ready - to indicate the current selection. The Ready mode must be selected in order for laser treatment to proceed.

F - Reset Key

Pressing the Reset Key resets the laser exposure counter displayed on the LCD back to 0. The maximum number is 9999 shots.

G - Interpulse Time Adjustment Keys For Repeat Mode

These up and down arrow keys allow the user to adjust the interval time between exposure times in repeat mode. The default value is set to 300 ms and is adjusted by these two keys from 100 ms to 1000 ms in 100 ms increments.

H - LCD Display

The LCD display is the communication interface between the surgeon and the system. It advises the surgeon as to the state of the system with the following information: the Terminal selected, the Mode configuration, the Shot Count, and Prompts/Messages.

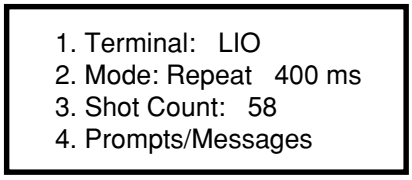


Figure 1-6
EyeLite® Display

1. Terminal selected corresponds with the selection made by the operator using the Terminal Selection key.
2. Indicates single shot or repeat mode selection with the interpulse time.
3. Counter contains the number of shots.
4. Each prompt must be confirmed by depressing the Confirm key. Each message informs the operator of the current system status.

I - Repeat Mode Selection Key

Repeat mode is selected by pressing the Repeat Mode Selection Key for at least two seconds. The two second delay serves to avoid any non-intentional setup. The LED above this key illuminates when the system is in repeat mode. The interval time between each shot in repeat mode is displayed on the LCD.

A single press of the Repeat key returns the system to single shot mode (one exposure time per footswitch depression determined by the exposure time selection).

J - Confirm Key

The Confirm Key allows the surgeon to respond to a system prompt which is displayed on the LCD during a procedure. Pressing the Confirm key represents a positive reply to a prompt. The system stays in the pending mode until a confirmation is given by the operator.

K - Key Indicator

The Key Indicator illuminates when the key is turned to the ON position.

L - Keyswitch

The keyswitch is a two-position switch where the key can be removed only in OFF position. In the OFF position, the main power to the system is shut off. In the ON position, an orange LED is illuminated.

M - Laser Aperture

An SMA connector with a fiber safety connection is provided to connect the EyeLite® to the desired delivery system (terminal); i.e., Slit Lamp adaptation, Laser Indirect Ophthalmoscope (LIO), or Endoprobe/ Aspirating probe. When the fiber is disconnected, a message is displayed on the LCD.

N - Laser ON/OFF Switch

- The system powers up with this switch ON. In this position the laser could be operational depending upon the next keystroke(s).
- When the switch is OFF, both lasers are OFF, the cooling system is powered, and the LCD alerts the surgeon that the system is in this mode.
- When the switch is turned ON again, the system goes back to the default value, and the terminal selection is the Slit Lamp.

O - Terminal Selection LEDs

When the desired terminal is selected, the LED that corresponds to the selected terminal illuminates.

P - Terminal Selection Key

The Terminal Selection Key allows the user to select one of the following terminals for operation: Slit Lamp Adaptation, Laser Indirect Ophthalmoscope (LIO) or Endoprobe/Aspirating probe. The selection "OTHER" is not enabled.

A selection is made by pressing and holding the Terminal Selection Key until the LED representing the desired terminal illuminates. When switching from one terminal to another, a prompt is displayed on the LCD which requires confirmation by pressing the Confirm key.

Q - Aiming Beam Intensity Knob

This knob is attached to a potentiometer which adjusts the intensity of the aiming beam. The computer adjusts the intensity limits depending upon the delivery system selected; therefore, at a given position the output intensity could be different from one delivery system selection to another.

The knob travels through 270° of rotation with minimum output in the farthest counterclockwise position and maximum output in the farthest clockwise position.

R - Power Adjust Knob

The power is adjusted by turning this knob which is attached to a three-turn potentiometer. If the potentiometer is not in the minimum position after the initial setup time, a warning message prompting the user to turn it to the minimum position is displayed on the LCD. The following power settings are available for the listed delivery systems:

0.03W - 1.7W (minimum) Slit Lamp
0.10W - 1.7W (minimum) LIO
0.05W - 1.7W (minimum) Endo/Aspirating Probe.

If the operator turns this knob too fast, a safety shutdown occurs as the system detects an invalid control command and displays the following message: “Potentiometer Fault”.

S - Power Indicator

The Power Indicator is an arrangement of four, 7-segment LEDs that shows the output power (in Watts) at the cornea.

REAR PANEL DESCRIPTION

A - Doctor's Filter Connection

The Doctor's Filter (for Slit Lamp and Endoprobe) is connected to this port. If the Doctor's Filter is not engaged, firing cannot occur and the message "Engage Dr's filter" is displayed on the LCD.

B - Footswitch Connection

The footswitch controls delivery of the treatment laser beam and is connected to the system through this port.

C - Relay Contact

A relay closure rated at 24 VDC, 1 amp is provided to comply with CE regulations.

D - Service Connector

The Alcon Field Engineer can access the system by connecting a computer to this port. A password is required to gain access to the system and this procedure can only be performed by qualified personnel.

WARNING!

Never use the EyeLite® for treatment when connected to a computer or any other device.

E - Power Entry Module

The main power cord is connected to the plug connector on the device with the necessary fuse to comply with electrical regulations. When the main power cord is connected and the power switch is turned on, an LED on the back panel illuminates.

F - Remote Interlock Connection

The Remote Interlock Connection permits the facility to connect a door-activated switch to the EyeLite® system.

When the Remote Interlock is activated, the surgeon is warned by a message displayed on the LCD (Laser Fault 07) and the lasers are turned off. Clear the Remote Interlock and reset the system by turning the EyeLite® key OFF then ON.

G - Volume Adjustment Knob

Provision for future applications.

H - Display Light Adjustment Knob

The LCD backlighting intensity is adjusted by turning this knob.

I - Expansion Connector

Provision for future connections.

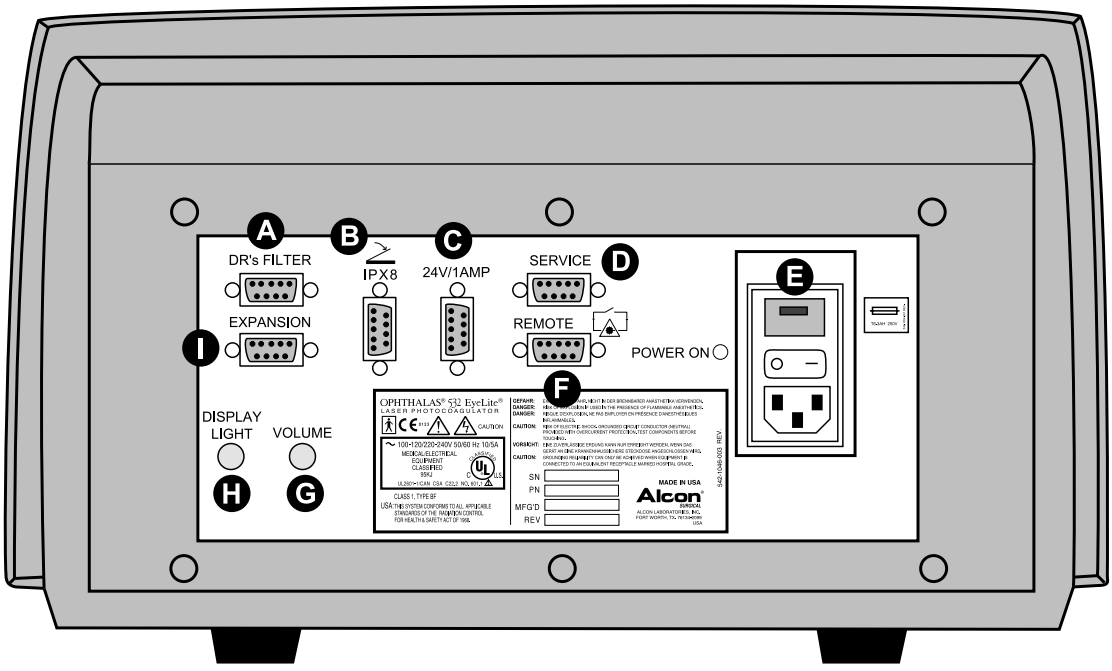


Figure 1-7
Rear Panel

INFORMATIVE MESSAGES

The messages listed in Table 1-3 are displayed on the LCD display to inform the operator of system status.

Table 1-3
EyeLite® Messages

MESSAGE	DESCRIPTION
Alcon 532 EyeLite XX	Represents the version of software in the system.
Please Wait	During the initial warm-up sequence, the LEDs flash for 8 seconds, and during transition from standby to ready for 2 seconds.
System Start-up	Start-up procedure.
Mode: Single Shot	When the system is in Ready mode with the Single Shot selection, an action on the footswitch delivers one shot per exposure time selected. If the footswitch is released prior to the termination of the exposure time, the treatment beam is interrupted.
Mode: Continuous	When the system is in Ready mode with the Continuous selection, an action on the footswitch delivers the beam until the footswitch is released.
Mode: Repeat XXX ms	XXX represents the interval time which can be selected. The range is 100ms to 1000ms in 100ms increments (default is 300ms).
Shot Count: XXXX	XXXX represents the number of shots. This can be reset to 0 by pressing the reset key, pressing the laser off button, activating the emergency switch or power off, or turning the keyswitch off.
Lasers OFF	When the OFF key is pressed, both lasers shut-down.
Terminal Slit Lamp	The operator has selected and confirmed the Slit Lamp terminal.
Terminal LIO	The operator has selected and confirmed the LIO terminal.
Terminal Endo	The operator has selected and confirmed the Endo terininal.
LIO Term Selected	This message flashes for 3 seconds to alert the operator that this selection has been made.
Power not in range OFF Condition	Power is not within ±20% before treatment. Treatment has been interrupted since the power is not within ±20%.
*----------	Laser emission is occurring.

The prompts listed in Table 1-4 are displayed on the LCD display when action is required by the operator.

Table 1-4
EyeLite® Prompts

PROMPT	DESCRIPTION
Connect Fiber	The system has detected that the fiber is not connected to the Laser Aperture SMA connector on the front panel. The system will stay in this mode until the connection is made.
Set power to minimum	The system has detected that the treatment power is not set to the minimum setting. For safety reasons, the system will stay in this mode until the Power Adjust knob is turned fully counterclockwise to the minimum setting.
Release Footswitch	The system has detected that the footswitch is depressed during warm-up or while transitioning from standby to ready. In order for the system to proceed, the footswitch must be released.
Engage Dr's filter	The system has detected that the Dr. Filter is not engaged. The system will remain in standby until the Dr. Filter is engaged.
Check Filter/Bridge Check Filter[1]	The system detected that either the Dr. Filter or the Bridge (3000LE™*) has not been connected or properly engaged. The system will remain in Standby mode until the connection is made.
Select Slit Lamp?	The Slit Lamp Terminal is selected. Pressing the confirm key sets the system for use with this terminal.
Select LIO Term?	The LIO Terminal is selected. Pressing the confirm key sets the system for use with this terminal.
Select Endo Term?	The Endo Terminal is selected. Pressing the confirm key sets the system for use with this terminal.
Dr. Filter in place?	The Dr. Filter must be properly in place on the Slit Lamp or Microscope to protect the Doctor during treatment.

[1] Displayed on Eyelase green.

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SECTION TWO
THEORY OF OPERATION

The purpose of this section is to provide general information regarding how certain PCB's and circuits operate and the functions they are responsible to perform. This section is not intended to provide an in-depth, component-level analysis of the system. Voltage and/or signal analysis can be performed by analyzing the schematics for the PCB's manufactured by Alcon. Theory of operation and schematics for OEM products used in the EyeLite® remain the property of the respective manufacturers.

Figure 2-1 is a block diagram which shows a simplified overview of the system. Following this diagram, each block is discussed in detail with an associated detailed diagram of the block. Refer to Tables 2-4 through 2-11 at the end of this section for descriptions of PCB interconnections.

BACK PANEL PCB (see Figure 2-2)

The Back Panel PCB consist of several circuits designed to provide an interface between the outside devices and the laser system. A secondary function is to provide power for certain PCB's and devices.

Power Entry Module

Power is received via the line source and processed in the Power Entry Module. The line voltage is then filtered through L3 and splits at this point. The first part of the voltage is sent to relay K1. When K1 is energized, it will send voltage to the power supplies. The other part of the voltage goes through a step down transformer and is reduced to 20V. This 20V signal is rectified by BR1 and regulated down to 12VDC. This 12V signal is sent to the green LED at the rear of the system and is then routed through the Front Panel PCB to check the status of the key switch. If the key switch and Emergency switch are properly set, the 12V signal is sent to energize K1 and power up the rest of the circuits.

DC Power

The Back Panel PCB receives ±12V and +5V from the Analog PCB through J6. These signals are processed and sent out to other PCB's used in the EyeLite. ±12V and +5V are sent to the CPU (Microprocessor) and Interface PCB's through J10. Part of the -12V is regulated down to -5V (U1) and then sent to the Interface PCB along with the ±12V and +5V through J10.

Filtered DC Power

The 5V signal received from the Analog PCB is amplified by a DC to DC converter to ±12V. This signal is designated by ±12VA. This ±12V is used to provide a clean (relatively noise free) ±12 volt signal to the analog devices of the Interface PCB (J1).

RS232 Service Port

This is a standard RS232 port. The connection to COM1 of the CPU PCB is made directly to this port. The expansion port is also a RS232 port, however, at this time it is not used.

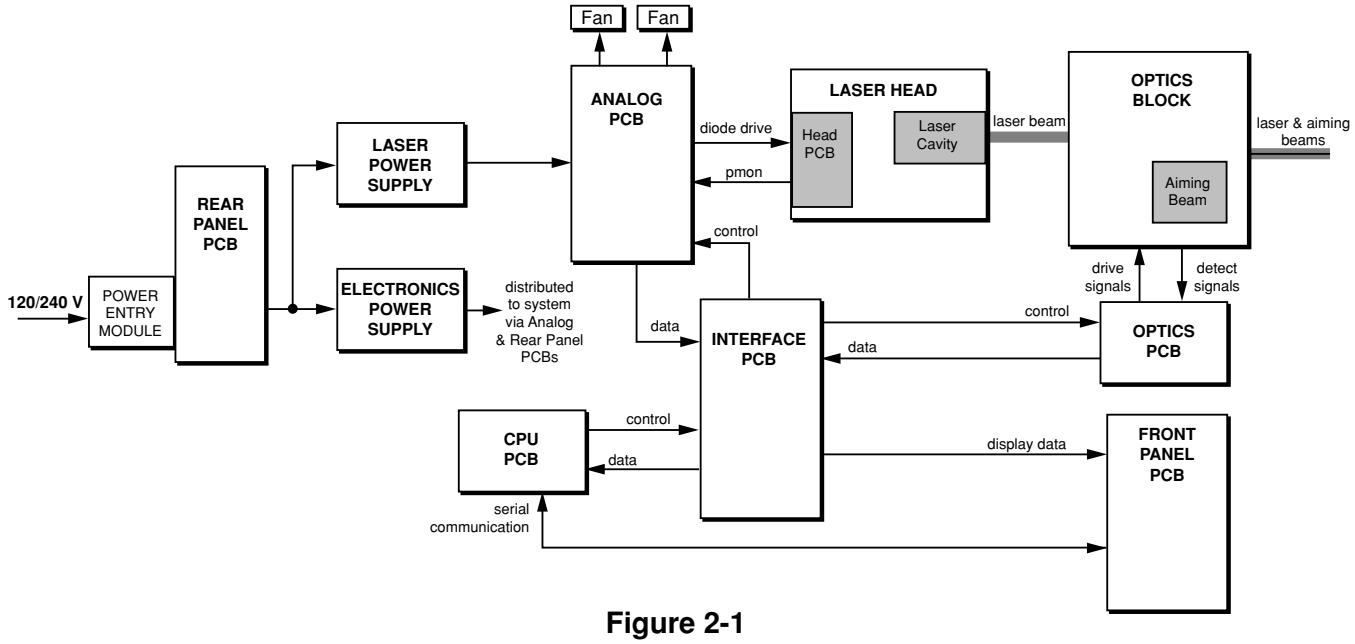


Figure 2-1
System Block Diagram

Doctor's Filter

The Doctor's filter circuit serves two purposes. Pins 1, 3, and 5 are used to monitor the micro switches of the Doctor's filter. These signals are routed directly to the Interface PCB. These signals are designated DRF1_1, DRF1_3, and DRF1_5. DRF1_CTRL is a buffered 5V analog signal from the Interface PCB. This signal is amplified by U4 and sent to Pin 6 however it is not currently used. There are provisions and circuits for a second Doctor's filter (U3) included as well, and are not used at this time.

OTHER CIRCUITS

Laser On

This circuit is used to activate an external warning lamp. When the EyeLite® is in the Ready mode the LZRDY signal is used to energize relay K2. When K2 is energized, power to activate an external relay is connected.

Interlock

The Interlock circuitry resides on the Analog PCB. The interlock connection is typically connected to switch located near a door in such a manner that opening and closing the door will operate the switch. The wires from the switch are connected to the interlock plug at pins 2 and 8. With the interlock plug connected and the door switch closed, the signal from the Analog PCB is pulled low. This originates from a relay. When the door is opened or the plug removed, the circuit on the Analog PCB is pulled high, the laser is disabled, and the interlock error signal is sent to the Interface PCB.

Footswitch

When the footswitch is depressed, FS_NC is high (+12V) and indicates to the Interface PCB that the footswitch is depressed. This +12V comes from the Optics PCB via J7. FS_NO is pulled low under the same conditions. When the footswitch is not depressed, FS_NO is high (+12V) and indicates to the Interface PCB that the footswitch is connected to the EyeLite.

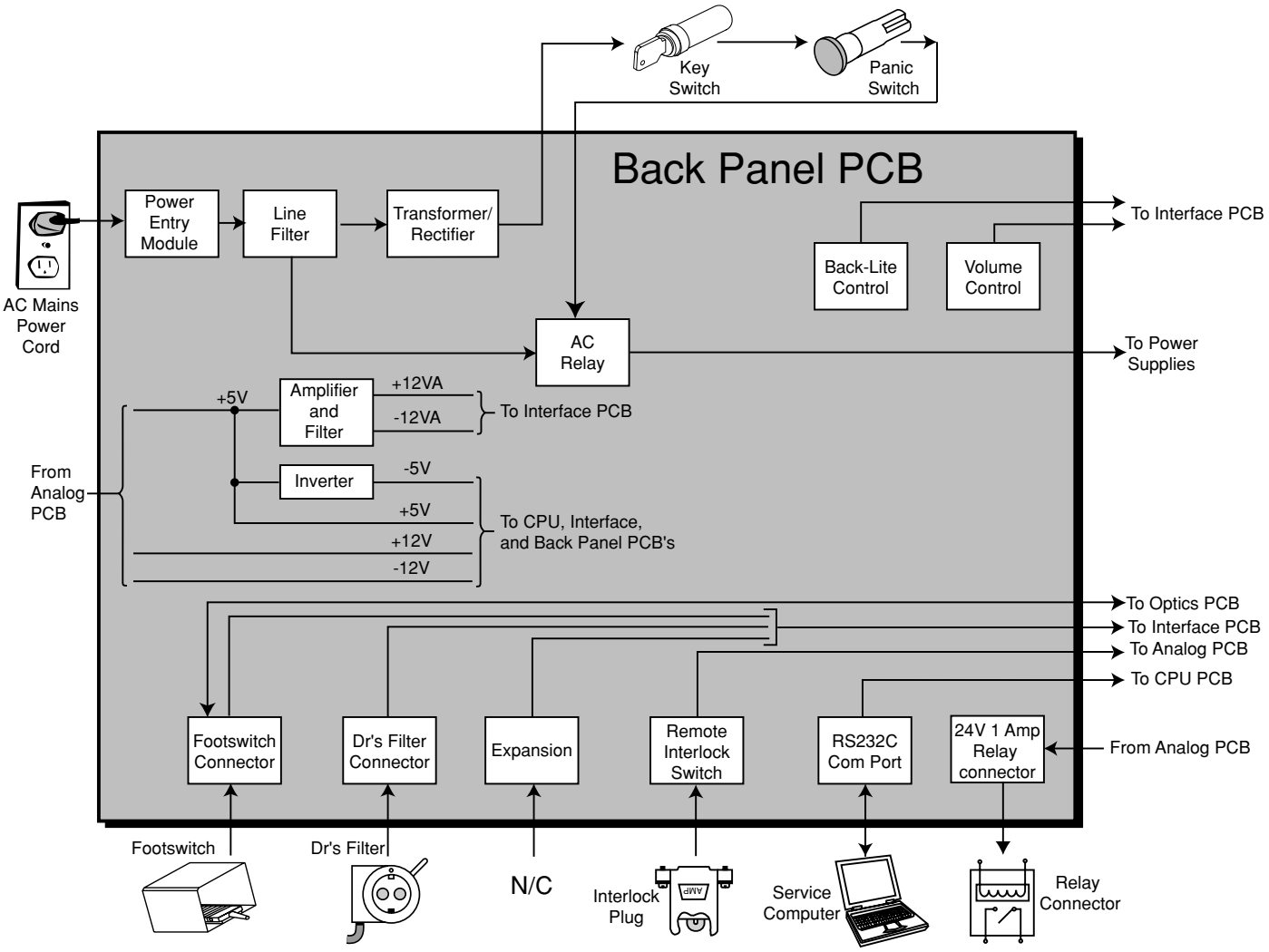


Figure 2-2
Back Panel PCB Block Diagram

LZON Signal

This signal is generated by the Analog PCB indicating that the laser is set to fire. It is routed to the Optics PCB by J7. A low signal indicates that the laser is ready.

Volume and Message Control

The +5V buffered signal is sent to two potentiometers via J1 pin 31. R24 controls the message panel display and R23 controls the volume. The volume function is not currently used.

POWER DISTRIBUTION (Figure 2-3)

The power supply module consists of two switching power supplies piggy-backed together. The upper supply is the Electronics Power Supply and supplies the necessary +12, -12, +5 V to run the circuit boards. Its output is connected to the Analog PCB.

The lower power supply is the Laser Power Supply which drives the laser diode and head TEC (thermo electric cooler). It provides -3.3 V at up to 38 amps for the laser diode, and 12 V for the TEC. Attached to the Laser Power Supply is a solid state relay that interrupts the 120/240 V input when it is determined that the laser head should be shut off.

The Laser Power Supply has a 5A 250V fuse on the input and the Electronics Power Supply has a 2A 250V fuse. Both fuses are of the T20 variety.

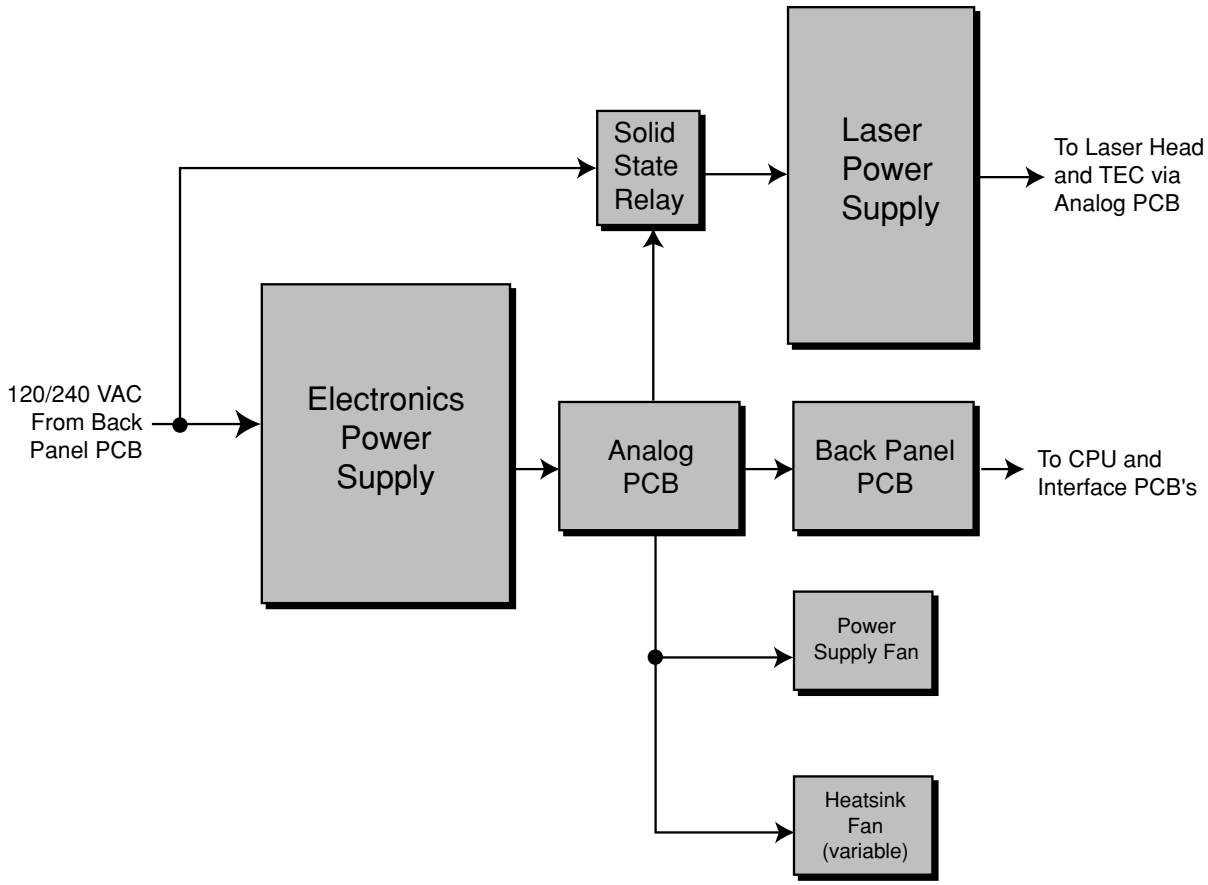


Figure 2-3
EyeLite® Power Distribution Block Diagram

CPU PCB

This OEM PCB (see Figure 2-4) is used to run a program designed by Alcon to control the EyeLite® laser. The code necessary to run the EyeLite® is transferred to the Interface PCB through the Synchronous Expansion Bus (SEB) in digital form. The SEB is the main communication port for the EyeLite®. CPU specifications are as follows:

- Intel386 EX processor.
- Intel 4 Mbyte Boot Block Flash, which contains a flash programming/loader utility.
- Bus/Memory Controller ASIC.
- PCMCIA Slot.
- Pipelined, zero wait state, page mode operation.
- Non-pipelined, one wait state, page mode operation.
- 1, 2, 4, 8, or 16 Mbyte DRAM.
- One single-sided x 32 SIMM.
- SVGA Local Bus Graphics Controller (512 Kbyte DRAM frame buffer).
- RTC with Extended Battery Backed RAM.
- PS/2 Style Keyboard and Mouse Interface.
- IDE Hard Disk Interface.
- PCMCIA 2.0 (single slot).
- Two asynchronous Serial Ports (COM1 and COM2).

EyeLite® Connections.
The EyeLite® uses COM1, COM2, PCMCIA Slot, and SEB (H2). Power is delivered through a separate DC power connector. Connector locations are shown in Figure 2-4 and defined in Table 2-1.

PCMCIA Slot (J2)
The PCMCIA (*Personal Computer Memory Card International Association*) is used to hold the Flash Card (Memory Card) that contains the EyeLite® program. This information is accessed by the EyeLite® when the system is turned on.

COM1 (JP3)
COM port 1 is a three wire serial communication port connected directly to the Back Panel PCB and used as the Service connection port. COM1 and COM2 pinouts are listed in Table 2-2.

COM2 (JP2)
COM port 2 is a 9 wire serial communication port connected directly to the Front Panel PCB and used to transfer serial data to and from the Front Panel controls.

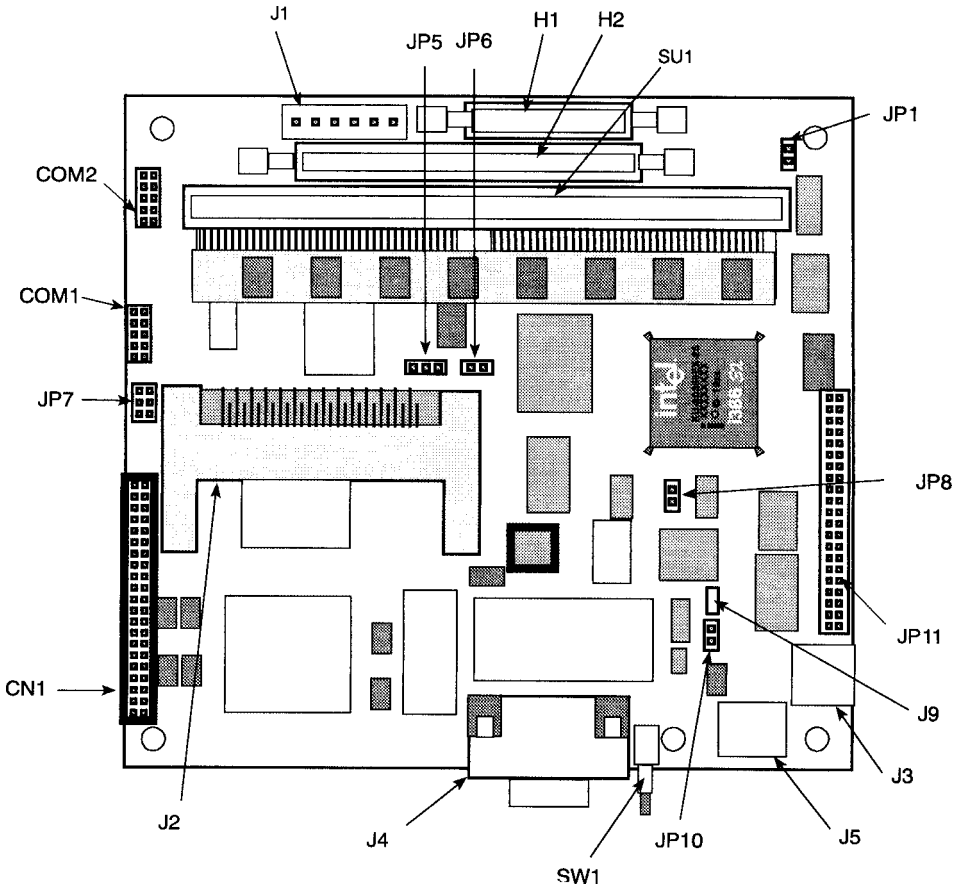


Figure 2-4
CPU PCB Connector Locations

Synchronous Expansion Bus (SEB) (H2)
Data and address information is transferred to and from the Interface PCB through the SEB.

Power Supply Connector (J1)
The CPU receives power from the Electronics Power Supply through this connector. Refer to Table 2-3 for pinouts.

Table 2-1
CPU PCB Connector Definitions

CONNECTOR/ JUMPER	LABEL ON PCB	FUNCTION	DEFAULT SETTING
CN1	FLAT PNL	Flat Panel Header	N/A
H1	H1	Digital I/O Connector	N/A
H2	H2	Synchronous Expansion Bus	N/A
J1	J1	Power Supply Connector	N/A
J2	J2	PCMCIA Connector	N/A
J3	MOUSE	Mouse Connector	N/A
J4	J4	VGA Connector	N/A
J5	KYBD	Keyboard Connector	N/A
JP1	MFG TST	Manufacturing Test	No jumper (do not use)
JP2	COM2	Serial Port 2 (standard)	N/A
JP3	COM1	Serial Port 1 (three-wire)	N/A
JP4	SPKR	PCMCIA Speaker	No jumper installed
JP5	PRGMBB	Program/Protect Boot Block	Jumper on pins 2-3 (Protect Mode)
JP6	OFF-1,4M ON-2,8,16M	DRAM Size	OFF (initially contains 1 Mbyte)
JP7	(none)		
JP8	SPKR	Speaker	No jumper installed
JP9	POST	Post-Loop Test	No jumper installed
JP10	FORCE UPDATE	Force Update	No jumper installed
JP11	IDE	IDE Connector	N/A

Table 2-2
CPU PCB COM1 & COM2 Pinouts

COM1 (JP3) Three-Wire Port		COM2(JP2) Standard Serial Port	
Pin	Function	Pin	Function
1	n/c	1	DCD
2	n/c	2	DSR
3	Rx	3	RxD
4	n/c	4	RTS
5	Tx	5	TxD
6	n/c	6	CTS
7	n/c	7	DTR
8	n/c	8	RI
9	GND	9	GND
10	n/c	10	n/c

Table 2-3
Power Supply Connector Pinouts

Pin	Function
1	OPEN
2	+5V
3	+12V
4	-12V
5	GND
6	GND

INTERFACE PCB (see Figure 2-5)

The Interface PCB receives commands from the CPU via A2J2, the Synchronous Expansion Bus (SEB). The SEB signals are tabulated in the CPU/INTERFACE Table. Address lines A1-A8 and Al2-A15 connect directly to U1, a Programmable Logic Device (PLD) which decodes the addresses according to the description given in the PLD Assignments Table.

Essentially the CPU communicates with the EyeLite® via the SEB and a serial communication port located on the Front Panel. The Interface PCB performs Analog to Digital Conversion of input signals received from the Analog Board by U7 and U14, 12 bit and 8 bit converters. Conversely, Digital to Analog conversion of the commands from the CPU is performed by three 8 bit converters, U8, U9 and U10. Single bit I/O (Input/ Output) is handled by the two PPI chips, U12 and U13. These ICs are used to input status, and to output control signals, primarily to the Analog PCB. Signals to and from the Optics PCB are handled through the PPI's.

A serial type I squared C bus is created by bit banging clock and data signals out of ports PC1 and PC4 of U12. In this manner, parallel data is converted into a serial bus stream (much like changing parallel data into serial data using a shift register) which is used to communicate with U23, an on-board EPROM, and U19 an EEPROM type digital potentiometer chip. Also, communication with the EEPROM located on the Analog PCB is effected by this serial bus. These PROMs are used for the nonvolatile storage of serial numbers and other data. They do not currently play an active function in the operation of the Interface PCB.

U3 and U4 are bus driver chips used to isolate the Interface PCB data bus from the CPU. Data direction is controlled by direction and control lines connected to the PLD. A counter timer chip, U5, is used as a safety check on the laser output control pulse, labeled DIO_CUR and output from U8. U8 is reset to its low level by triggering -LDAC6 low at the end of the safety pulse time out.

Interrupts reserved for future use are implemented by the interrupt controller chip, U2. Also reserved for future use is the sound chip circuitry consisting of U6, a Yamaha Digital to Analog Converter which is used to input serial data to U20. U20 in conjunction with U22 generates analog sound data which is amplified by U21 and U24. U24 is the TDA7052A audio amplifier whose volume is controlled by the voltage developed across a potentiometer located on the Back Panel. The potentiometer signal VOL_CTRL is amplified by U21 and output to the volume control circuit of U24.

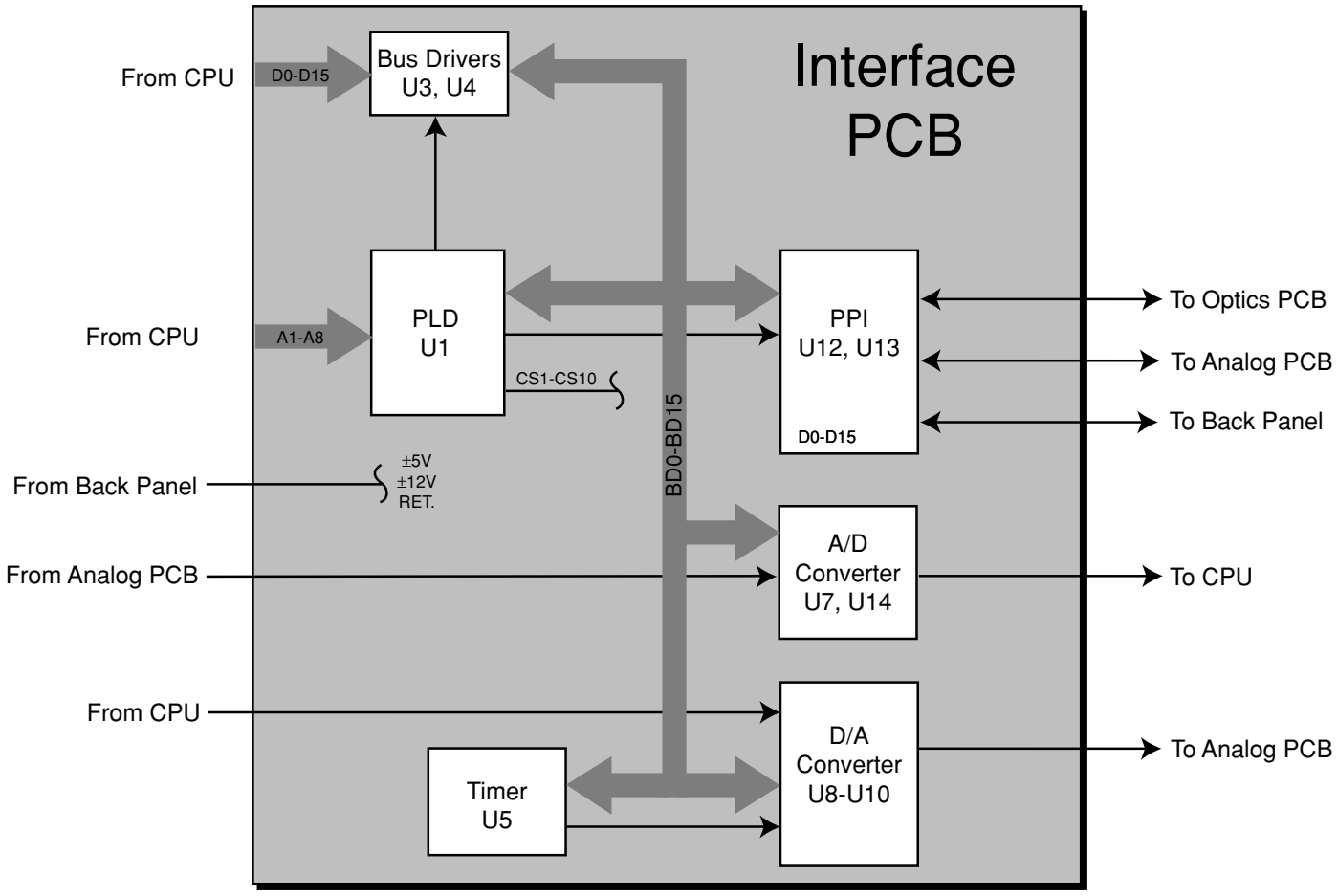


Figure 2-5
Interface PCB Block Diagram

ANALOG PCB (see Figure 2-6)

The Analog PCB is an OEM product that controls and monitors all functions of the laser engine (head). It provides current and temperature controls to the laser head.

Watchdog
The Watchdog circuit is a mechanism that shuts down the laser diode driver and the diode power supply unless it receives the correct signal from the CPU. A 500Hz TTL square wave generated on the Interface PCB tells the Watchdog monitor circuit that the EyeLite® is working properly. Additionally the Watchdog signal is used as a clock for the Current Fault Detect, and SSR Time Out. Absence of the Watchdog signal as a clock will prevent any other circuit from activating the laser. When this condition occurs the output of U8 goes low and triggers a fault condition to control PAL U13 and in turn triggers the SCR to short to ground.

Diode Current Control
The current is controlled through the use of current sensors, comparator, and target level current setting. The signal DIO_CUR is received from the CPU via the Interface PCB. This value is compared with the value of the current sensor (S1). Any difference is amplified by U1 and causes the current to increase or decrease.

Light Loop
The Light Loop is an optional tool used to control the current. A reference voltage is set by the CPU via the Interface PCB for comparison with the Photocell (PMON1). With the Light Loop turned on, the diode current can be adjusted by monitoring the FD_BAK (feedback) signal and adjusting the REF_LVL (reference level) voltage up or down. The analog current loop is added to the output of the Light Loop and is fed to U1 to control the laser output.

Diode Current Shutoff
The Diode Current Shutoff is a controlled way of turning the diode current on or off. When Q1 is turned on, the gate drive of the series pass FETs is pulled down and thus turning them off.

Over Current Monitor
An overcurrent situation occurs when the current set point voltage is less than the voltage of the current sensor S2. When this condition occurs the output of U7 goes low and triggers a fault condition to interlock PAL U13 and in turn triggers the SCR to short to ground.

Over Voltage Monitor
The purpose of the Over Voltage Monitor is to protect the diode in case a failure turns on the current drive circuitry. A comparison is made between the actual voltage sensed to the diode and a preset value. If the actual exceeds the preset at U7, a fault signal is sent to the PAL U13 and triggers the SCR to short to ground.

Interlock PAL
The Interlock PAL receives the fault signals then generates the appropriate error codes (LEDs) and takes appropriate action, mainly shutting down the laser through the SCR. Through the use of a clock signal and the latching function of the PAL, changes to the IR Relay Control are limited to the times when the diode current is off.

Diode Power Supply Crowbar
This circuit's primary function is to shut down the laser immediately in the event of a catastrophic failure. When a fault signal is received, Q3 turns on which turns on TH1. TH1 shorts the -3.3V signal from the 300W power supply to ground. This remains shorted as long as current is supplied through R43. Soon after the crowbar circuit is activated, a signal is sent to the Solid State Relay (SSR) causing it to open, and thus turning off the 300W diode power supply.

SSR Timeout
The SSR (Solid State Relay) located on the power supply module is controlled by the SSR signal. Upon power up of the system the SSR is locked out until a reset signal is sent to Timer U14. When the microprocessor sends the reset signal, the Timer is clocked by the Watchdog circuit and the PAL allows the SSR to turn on.

Head Temperature Control
The laser head uses a Thermo Electric Cooler (TEC) to maintain proper laser head temperature. This device is capable of cooling and heating. It is comprised of two dissimilar materials that, when current is applied to it, will cause one material to heat and the other to cool. If the current is reversed, the cooling and heating action is reversed. A thermistor monitors the head temperature and provides the control signals to the TEC circuit. If the temperature is too high, current is sent through the TEC to provide cooling. Conversely if the temperature is too low the current it sent to provide heat. When the cooling function is enabled, LED11 illuminates. Over or under temperature conditions will cause a fault. Optimal operating conditions are set by the manufacturer.

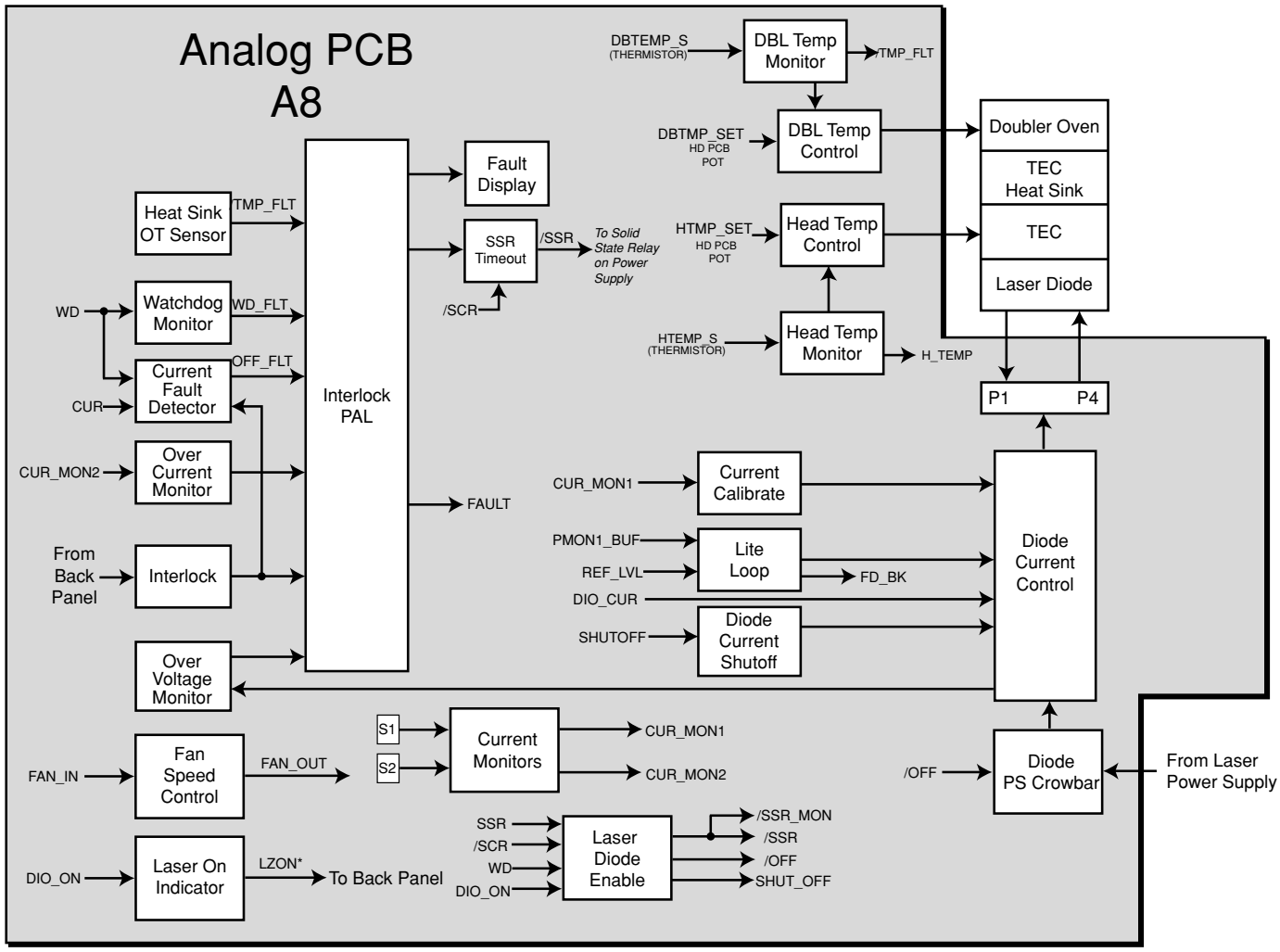


Figure 2-6
Analog PCB Block Diagram

Doubler Temperature Control

The doubling crystal temperature is monitored by a thermistor. Optimal operating conditions are set by the manufacturer. The output of the thermistor is tied to a heater that keeps the temperature in its optimum range. A fault condition (interlock) is sent to the Interface PCB and then the CPU if the temperature of the doubling block exceeds its established boundary.

Fan Speed Control

The Fan Speed Control circuit consists of a comparator/amplifier circuit and a voltage limiting diode circuit. Signals from the head temperature control circuit are analyzed by the CPU and then sent to the fan speed control circuit. As the temperature increases, the input to the comparator circuit increases and the output decreases. A decrease in the output causes an increase in fan speed. Diodes limit the minimum voltage to the fans to 12V.

LASER HEAD (see Figure 2-7)

NOTE: There are no serviceable parts inside the Laser Head. It is imperative that no attempts be made to disassemble the Laser Head.

The Laser Head assembly is a sealed box that contains the Head PCB, Laser Cavity (YAG Rod, Diode, and Mirrors), Doubling Crystal, Photocells, and Thermistors.

Head PCB

The Head PCB contains the adjustments for the Diode Max Current, Head Temperature Set, Doubler Temperature Set, Photocell monitors (PMON 1 and PMON 2) and EEPROM. This PCB is part of the Laser Head and is not replaceable. All adjustments except the Photocell monitors are preadjusted to match the performance characteristics of the Head and should not be changed.

Laser Cavity

The Laser Cavity is hermetically sealed to prevent contamination. It contains the YAG rod, Photocells, Diode, and Mirrors. The YAG rod is side pumped by a diode array. The current controlled diode array controls the output power. The IR beam resonates between the mirrors and the doubling crystal. As the IR passes through the temperature-controlled crystal, the second harmonic is filtered out and passed through a Green Output coupler and IR high reflector. This arrangement is known as Intercavity Doubling. The optic assembly of the laser head is mounted to a thick plate. Attached to this plate is a TEC (Thermo Electric Cooler), which in turn is attached to a large heat sink. When the head temperature is too high the TEC cooling element is turned on and transfers the heat to the heat sink.

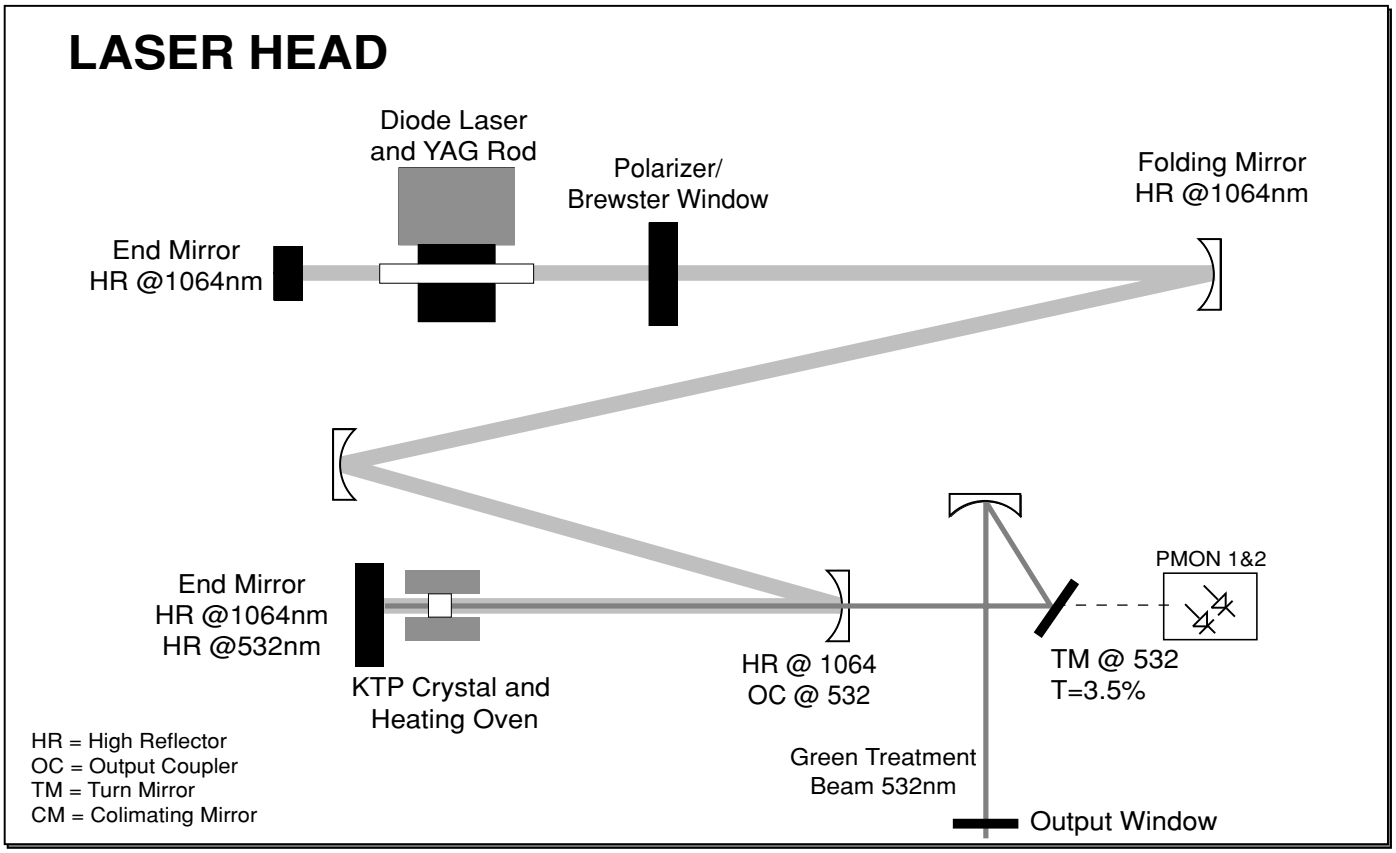


Figure 2-7
Optical Path Diagram

OPTICS PCB (see Figure 2-8)

The Optics PCB is responsible controlling all of the components on the Optics block. It receives commands from the Interface PCB and sends them to the appropriate component. Additionally, it takes data (signals) from the various components, processes it, and then sends the results to the Interface PCB.

Shutter Safety Interlock

The safety interlock circuit routes the +12V through the footswitch to the shutter motor driver circuit prior to the footswitch being depressed. This circuit insures the shutter cannot be opened unless the footswitch is depressed.

Shutter Motor

The shutter motor drive signal comes from the Interface PCB. A logic level high is input to an amplifier (U3) to boost the signal to 5V. A logic low at the input is amplified to -2V. The +5V signal is used to open the shutter, the -2 V is used to close it. This signal is routed to a comparator that checks the signal from the push-pull circuit. If the LZON signal is low (Laser enabled) the shutter drive signal is transmitted to the shutter motor. If the LION signal is high, the shutter drive signal is blocked.

Shutter Position

The shutter position is detected by an optical interrupter. With the shutter open the photo transistor conducts and saturates the transistors. With the transistor saturated the input to the op amp (U4) is low and drives the output high. With the shutter closed the collector of the photo transistor is open and the input to the op amp is high with respect to Vref and drives the output low.

Fiber Detection

Fiber detection consists of an optical interrupter circuit and an operational amplifier. A signal is sent to the LED that illuminates the photo transistor of the optical interrupter. The collector of the photo transistor is tied to a comparator circuit (U1) that compares the input with a reference voltage. When a probe is inserted, the collector of the photo transistor opens. With an open collector, output of U1 is high with respect to Vref which drives the output of the op amp high. When a probe is absent, the photo transistor saturates and the potential at the collector is a ground level. With the input at U1 less than Vref, the op amp is driven low. These signals are sent to the Interface PCB (J6) for monitoring.

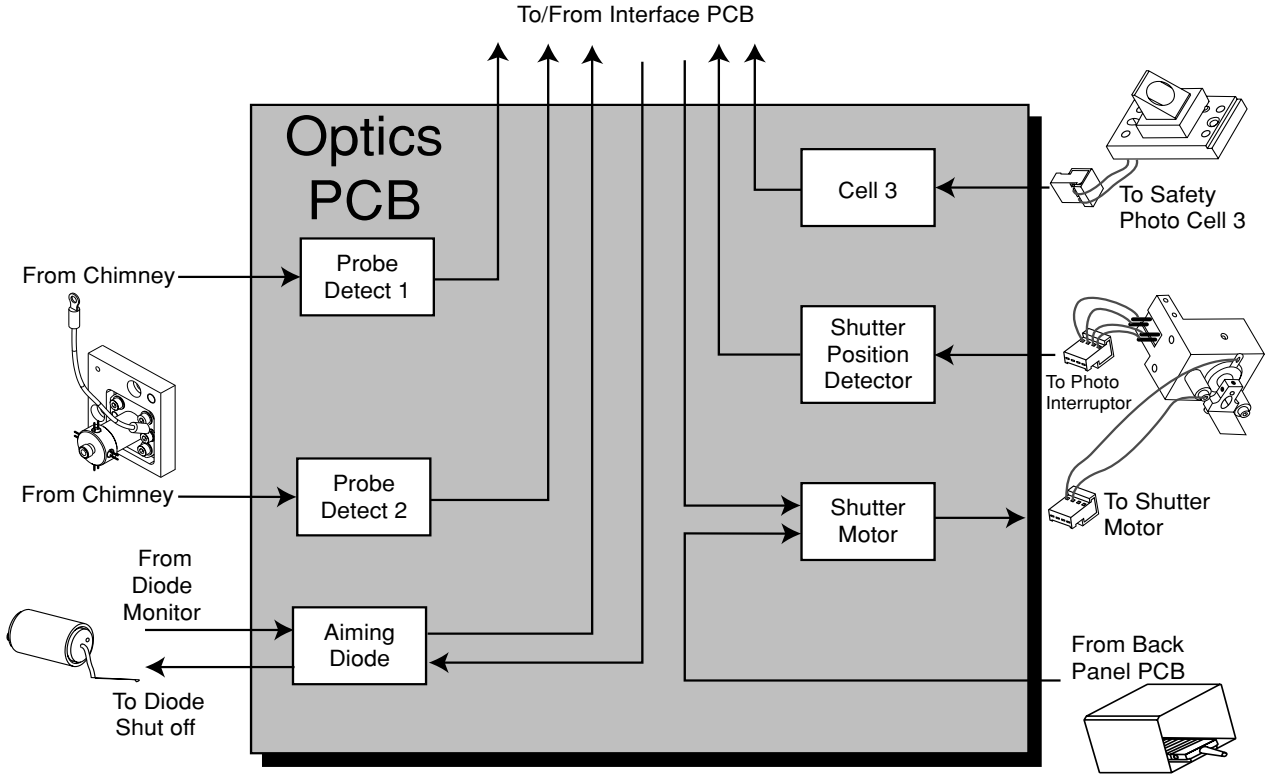


Figure 2-8
Optics PCB Block Diagram

Cell 3 Detection
A photo cell is mounted on the surgical folding mirror located on the bottom of the optic block to detect the presence of a laser beam beyond the shutter. The photo cell is adjusted to the minimum amount of laser beam emitted at the output of the laser. This signal is filtered and amplified by U7 and U5 respectively then compared to Vref at U4. If no signal is detected, the input to U4 is less than Vref and the output (C3_DET) is driven low. A logic level high C3_ DET indicates that the laser beam is detected. If the laser is not firing, a logic level high will generate an error code.

Aiming Beam
The Interface PCB generates the signal Aim SO to control the Aiming Beam Laser. A high signal shuts off the laser during firing. A low signal enables the laser. The intensity is controlled by Aim BP. Built into the aiming beam module is a 50 µW sensor. This sensor is used to tell the Interface PCB if the aiming beam laser is on when power is applied.

External Speaker
A speaker signal generated on the Interface PCB is routed through the optics board to the speaker.

Other Circuits
There are three LED's that are used for visual verification of voltages.

LED 1 = 5 Volts
LED 2 = -12 Volts
LED 3 = +12 Volts

FRONT PANEL PCB (see Figure 2-9)

The Front Panel PCB is responsible for the following:
- Displaying user information and prompting for user input.
- Displaying system parameters (7 segment LEDs) and status (LEDs).
- Decoding key switches.

The functions of the Front Panel are controlled by U8 a Motorola Microcontroller. This integrated device is programmed as a key decoder, lamp encoder, frequency counter, and message display controller.

Message Display
Messages are received from the CPU through W22. W22 is connected to COM 2 (RS232) and is routed to a RS232 serial receiver/driver. From here they are sent to the LCD Message Display Card through W28.

Key Decoder/Lamp Encoder
U5, U6, and U7 in conjunction with U8 form a multiplexed keypad switch and LED matrix. These signals are input to the Display PCB. The Display PCB monitors keypad strokes and sends information to the microcontroller. Depending on the function, the CPU will return a signal to illuminate the appropriate status LED.

Frequency counter
The aiming potentiometer is attached to a Variable frequency oscillator (U16). As the aiming potentiometer is adjusted, the pulse width of the oscillator changes. The microcontroller (U8) sends this data to the CPU PCB for further processing.

Other Functions

Contrast Controls
The signal from the Back Panel PCB Illumination Pot is routed to the Display PCB via the Interface PCB and the Front Panel PCB. This signal is passed to the display assembly and controls the contrast of the LCD characters.

Timer Display Card
The Timer Display Card receives the multiplexed signals DS1-4 and the driver signals A-G and uses them to display the selected exposure time on four 7 segment LED’s.

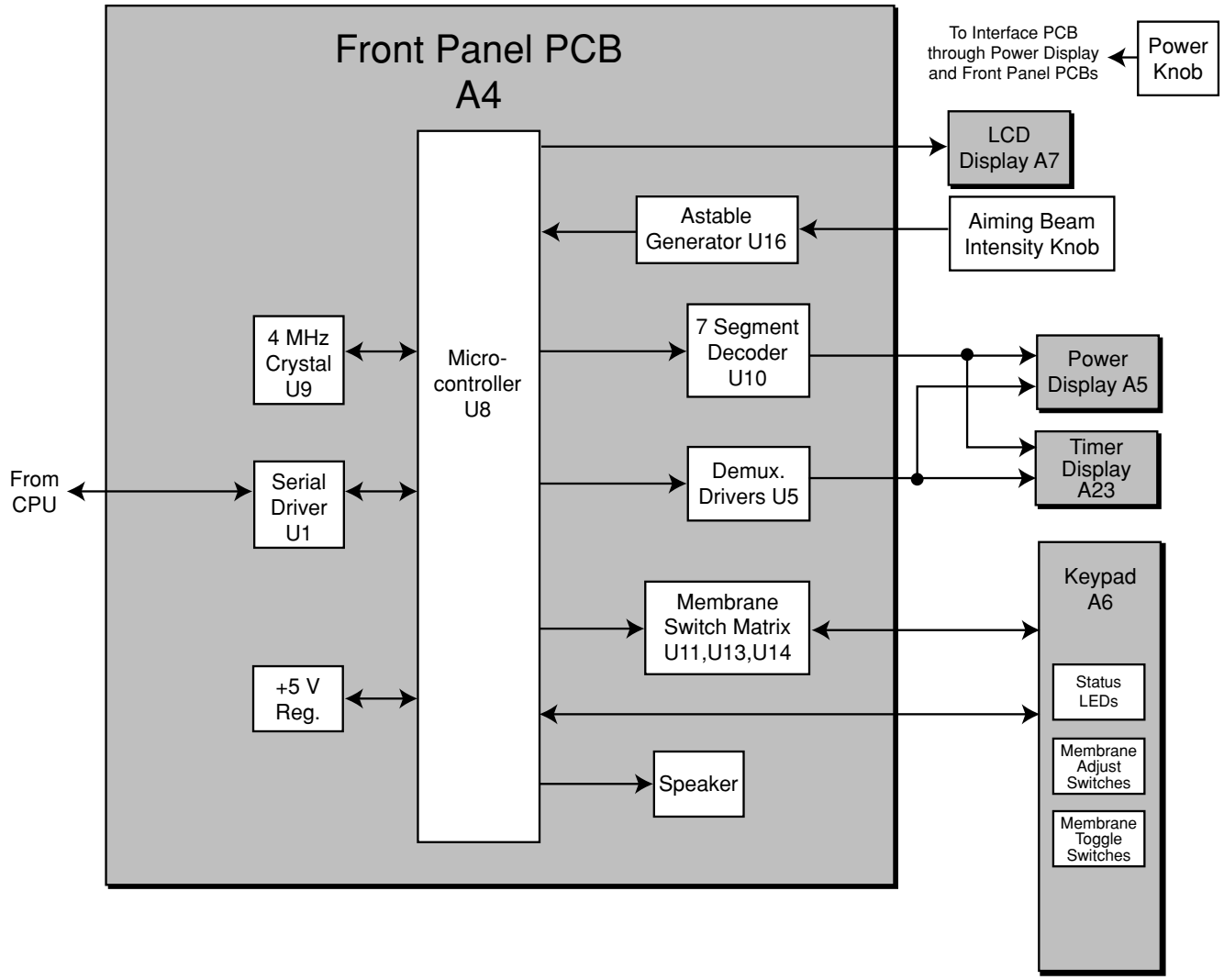


Figure 2-9
Front Panel PCB Block Diagram

Power Display Card
The Power Display Card receives the multiplexed signals DS1-4 and the driver signals A-G and uses them to display the power selected by the Power Potentiometer on four 7 segment LED's. Also located on this card are the pass throughs for the Power Potentiometer, Key switch, and Emergency switch.

Message Display Card
The Message Display Card is an OEM product that incorporates the LCD encoder. Parallel data is sent to the card via the CPU through U8. The card also has a voltage controlled contrast signal (from the FP pot R16), and a 5V backlight signal.

Keyswitch and Emergency Stop
A buffered 12V signal from the Back Panel PCB is routed through the Emergency Stop switch and the Keyswitch. See Back Panel PCB description for additional information.

Table 2-4
Analog PCB to Laser Head Signals

SIGNAL NAME	DESCRIPTION
AGND	Analog ground.
-MAX	Diode current maximum set point. (28-40A)
+5R	Regulated 5V for adjusting pots in the head.
HTMP_SET	Diode temperature set point (0-5V = 15 - 40 deg).
HTEMP_S	Diode temperature sensor.
AGND	Analog ground.
DBTMP_SET	Doubler temperature set point (5-0V = 50-90 deg).
DBTMP_S	Doubler temperature sensor.
DB_HEAT	Doubler TEC driver (3-12V).
GND	Ground.
PMON1	Green light photodiode for light loop.
PMON2	Duplicate photodiode (for monitoring).
V+	+12V for photodiode bias and to generate 5V.
EECLK	EEPROM clock line.
EEDAT	EEPROM data line.
GND	Ground.

Table 2-5
CPU PCB to Interface PCB (A2J3) Signals

SIGNAL NAME	DESCRIPTION
(DI00-DI07)	N/A
(WDT)	N/A
(CLK2X)	N/A
(IRQ5)	N/A
INT2	Hi level interrupt to CPU. Output of U17-2.
INT3	Hi level interrupt to CPU. Output of U2-17.
(INTRQ12)	N/A
(12V)	N/A
(-12V)	N/A
(RTC)	N/A
(+5V)	N/A
(GND)	N/A

Table 2-6
Back Panel PCB to Interface PCB (A2J7) Signals

SIGNAL NAME	DESCRIPTION
5V	-5 Volt power generated on Back Panel PCB from -12 Volt power by linear regulator U1. Input to IF PCB via A2J7-1.
+5V	+5 Volt power input to IF PCB via A2J7-2. Power supply voltage via Analog and Backplane PCBs.
+12	+12 volt power input to IF PCB via A2J7-3. Power supply voltage via Analog and Backplane PCBs.
-12	-12 volt power input to IF PCB via A2J7-4. Power supply voltage via Analog and Backplane PCBs.
GND	Power return to Back Panel PCB via A2J7-5, 6

Table 2-7
Analog PCB to Interface PCB (A2J1) Signals

SIGNAL NAME	DESCRIPTION
-ENABLE	Out to enable laser from U12-20. (Lo).
RESET	Hi level to clear faults on Analog. Output from U13-22.
ENABLE	Out to enable laser from U12-21. (Hi)
DIO_CUR	Output of U8-3. Analog Signal level sets power output of Laser. 0 to +5R (reference) volt range for 0 to max current.
LITE_LOOP	Output of U13-6. Lo level activates light loop.
REF_LVL	Output of U8-2. 0 to +5R volts. Reference level for light control.
PMON1	Input to U7-2 after passive filtering. Buffered Photo monitor light level.
IR_GRN	Output of U12-6. Lo level selects Green Option on Analog PCB (not used).
WD	Watch dog oscillator input to watchdog timer on Analog PCB. Output of U3-16. (500 Hz)
IR_LAT	Input to U12-26. Hi level verifies selection of Green Mode. Verification (not used).
-FAULT	Lo level indicates fault. Input to U17 inverter which outputs INT2 for input to CPU.
FLT_0	Fault bit 0.
FLT_1	Fault bit 1.
FLT_2	Fault bit 2.
+5R	+5 volt reference voltage generated on Analog PCB.
CUR_MON 1	0 to +5R volts input to U14-6. Indicates 0 to 50 amps.
CUR_MON 2	0 to +5R volts input to U14-5. Indicates 0 to 50 amps.
H_TEMP	0 to +5R volts input to U14-4. Indicates Diode temp sense, 15° to 40°C range.
PMON2	0 to +5R input to U7-4 after passive filtering.
HS_TEMP	0 to +5R input to U14-3. Indicates 60° to 10°C range of Heatsink temperature.
VDS_SNS	0 to 2.5 volt range input to U14-2. Corresponds to -5 volt to 0 volt on the diode power supply.
AGND	Analog Ground on the Analog PCB.
-OC_TEST	Input to U12-24. Lo level to create Over Current simulated fault.
-OV_TEST	Input to U12-25. Lo level to create Over Voltage simulated fault.
FD_BAK	0 to +5R input to U7-5. Output of error loop amplifier on Analog PCB. (0 to 5V = -3A to + 3A nominal adjustment).
FAN_IN	Output of U9-27. 0 to +5R range for off to high fan speed.
EECLK	Output of U12-17. Digital clock for EEPROM programming.
EEDAT	Output of U12-15. Digital serial data line for EEPROM programming.
ACKL	Hi level input to U13-13 indicates acknowledge state of Analog PCB.
GND	Digital Ground Connections via pins A2J1-1,3,5,7,9,11,13,15,17,19, 21,23,37,41,43,45.
AGND	Analog Ground A2J1-34.
-SSR_MON	A low signal indicates the solid state relay has turned on the 300W switching power supply.

Table 2-8
CPU PCB to Interface PCB (A2J2) Signals

SIGNAL NAME	DESCRIPTION
A0 - A25	Address lines from the CPU Synchronous Expansion Bus Connector A2J2.
NOTE:	Signals in parentheses ( ) denote signals not connected on the Interface Card to any device. These signals are reserved for future use.
A0-A8	For the current design Address Lines A0-A8 and lines A12-14 are routed directly to U1.
GND	Digital Ground Plane lines connecting CPU to Interface Ground via GND pins.
(+5V)	+5 volt power bus signal on the CPU PCB. The +5V pins are brought out to the Interface PCB via A2J2 pins but are not connected to any component on the Interface PCB.
-BHE	Byte High Enable - reserved input to the PLD
D/C	Data/Command - reserved input to the PLD
M/IO	Memory I/O
D0-D15	Data Lines
BALE	Address Latch Signal
IOR	SEB I/O Read Strobe
-IOW	SEB I/O Write Strobe
IOCHRDY	I/O Channel Ready - used to extend SEB cycles
-IOCS16	I/O Channel Select 16 - indicates a 16 bit I/O device is being accessed
PWRGD	Power Good - used to generate a reset
CLKSYS	System Clock input to Interface - 8 MHz
(-WR)	N/A
(-RD)	N/A
(-MEMR)	N/A
(-MEMW)	N/A
(IMEM16)	N/A

Table 2-9
Back Panel PCB to Interface PCB (A2J6) Signals

SIGNAL NAME	DESCRIPTION
(FS_COM)	N/A
FS_NO	Foot Switch Normally Open. Hi level indicates switch is not depressed. Input to U13-3.
FS_NC	Foot Switch Normally Closed. Hi level indicates switch is depressed. Input to U13-4.
DRF1_CTRL	0 to +5 volt control signal at U10-11. Signal is amplified and output to Dr.Filter No. 1 via Back Panel PCB.
DRF1_1	Logic level input from Dr. Filter No.1 via Back Panel PCB. Input to U13-2.
DRF1_3	Logic level input from Dr. Filter No.1 via Back Panel PCB. Input to U13-43.
DRF2_1	Logic level input from Dr. Filter No.2 via Back Panel PCB. Input to U13-44.
DRF2_CTRL	0 to +5 volt control signal at U10-10. Signal is routed to Back Panel PCB where it is amplified by U3. Signal is reserved for future use.
DRF2_3	Logic level input from Dr. Filter No. 2 via Back Panel PCB. Input to U13-42.
(DRF1_5)	N/A
LZRDY	Laser Ready. Hi level output from U13-19 indicates Eyelite™ is operational. Signal is routed to Back Panel PCB via A2J6-11. Signal controls LASER ON relay for remote indication of Eyelite™ use.
ILOCK	Interlock Signal generated by external relay closure and input to Analog PCB via Back Panel PCB. Lo level indicates equipment may be used. Hi level locks out Laser Firing by Analog PCB. ILOCK is monitored by input to U13-41.
LZON	Lo level indicates laser is set to fire. Hi level indicates laser cannot fire. Input to U13-14.
+12VA	+12 volt Analog Power generated on Back Panel PCB by U5. Used by U8, U9, and U12.
-12VA	-12 volt Analog Power generated on Back Panel PCB by U5. Used by U7.
+5R_BUF	Buffered +5R voltage sent to Back Panel PCB. Voltage used to power Message Control and Power Control Potentiometers located on Back Panel PCB.
MD_CTRL	Message Display Control. 0 to +5R analog signal developed by Message Control Pot on Back Panel PCB and routed to Front Panel.
VOL CTRL	Volume Control signal. 0 to +5R analog signal developed by Volume Control Pot on Back Panel PCB. This signal is input to U21 and controls the volume of audio amplifier U24.
AGND	Signal return path for analog signals routed to Back Panel PCB.

Table 2-10
Front Panel PCB to Interface PCB (A2J5) Signals

SIGNAL NAME	DESCRIPTION
ESON	Hi level signal input from Front Panel. ESON lo triggers -0VTEST to be low.
GND	Digital ground interconnect to Front Panel.
MD_CTRL	Message Display Intensity Control. Signal line interconnect on IF. A2J6- 22 to A2J5-6. Connects Control Pot on Back Panel PCB to Message Display Intensity input on Message Display Unit via Front Panel.
+5R_BUF	+5R voltage input from Analog PCB buffered by U21.
AIM_PC	Aim Beaming Potentiometer Wiper Voltage. Input to U9-3. Not implemented. Reserved for future use.
LP_PC	Laser Power Potentiometer Control. Signal input to U7-2.
AGND	Analog ground or signal return line connection to Front Panel at A2J5-10.
CLICK	Input signal to C41 and Op Amp U21 from U8-4 located on Front Panel. This is the Beeper Signal which is made available to the Audio Amp located on the Interface PCB. Feature not implemented.
EECLK	Serial Clock Data generated at U12-17.
EEDAT	Serial Data signals generated at U12-15.

Table 2-11
Optics PCB to Interface PCB (A2J4) Signals

SIGNAL NAME	DESCRIPTION
+5V	Power Bus voltage output to Optics PCB on A2J4- 1, 2.
GND	Digital Ground connected to Optics PCB on A2J4,5.
+12V	Power Bus voltage output to Optics PCB on A2J5,6,7.
AGND	Analog Ground connected to OPTICS PCB on A2J8, 9, 13.
OUT_P1	OUT_P1 is the corresponding output signal of PDET1. For Fiber inserted, this signal is Hi level. For Fiber missing, this signal is Lo level. (TP3)
OUT_P2	OUT_P2 is the corresponding output signal of PDET2. For Fiber inserted, this signal is Lo level. For Fiber missing, this signal is Hi level. (TP4)
AIM_SO	Aim Beam Power Shutoff Hi level shuts off Laser Lo level enables power by connecting +5V to Aim Beam Laser.
AIM_BP	Aim Beam Power Level is controlled by 0 to approximatey 1.3 volts analog input voltage to Aim Beam Laser. Output generated by U9 D/A at U9-3.
AIM_OD	Aim Beam Output level indicator. AIM_OD Hi indicates laser output is greater than 50 micro watts. Lo level indicates laser output less than 50.
C3_DET	Output signal from Optics. Hi level indicates 532 Laser output present. Lo level indicates minimum 532 output not detected. C3_DET is input to U12-6.
ST_POS	Output signal from Optics. Corresponds to STPOS. Lo Level for Shutter closed. Hi level for shutter open. Signal input to U12-41.
ST_DRV	Output Signal to Optics. Hi level opens shutter. Lo level closes shutter. Output generated at U12-28.
SPKR	The Speaker signal and its return are output to the Optics PCB on pins 25 and 26 of A2J6. Signal originates at U24, the TDA7052A audio amplifier pins 5 and 8.

SECTION THREE
PARTS LOCATION & DISASSEMBLY

GENERAL INFORMATION

This section is written to instruct field engineer on how to locate, gain access to, and remove subassemblies and parts from the EyeLite® Laser. Part numbers and engineering assembly drawings are located in Section Seven.

DISASSEMBLY PROCEDURES

Figure 3-1 illustrates an exploded view of the system which should be referred to throughout the disassembly instructions.

1 Removal of Top Cover

1.1 Disconnect mains AC power cable, Doctors Filter cable, and footswitch cable from Back Panel.

1.2 Carefully place unit on its side or upside down, and remove eight screws (M4X8) securing Top Cover to base plate using a 3mm wrench. Return unit to its normal upright position.

1.3 Remove six screws (M4X12) securing Top Cover to Back Panel using a 3mm allen wrench.

1.4 Remove two screws (M4X8) securing Top Cover to Front Panel using a 3mm allen wrench.

1.5 Slide Top Cover toward back of unit to remove.

CAUTION

Do not use handle to slide Top Cover back.

2 Installation of Top Cover

2.1 Starting at back of unit, slide Top Cover forward until it is flush with Back Panel.

2.2 Install two screws (M4X8) securing Top Cover to Front Panel.

2.3 Install six screws (M4X12) securing Top Cover to Back Panel.

2.4 Carefully place unit on its side or upside down, and install eight screws (M4X8) securing Top Cover to base plate.

2.5 Return unit to its normal upright position.

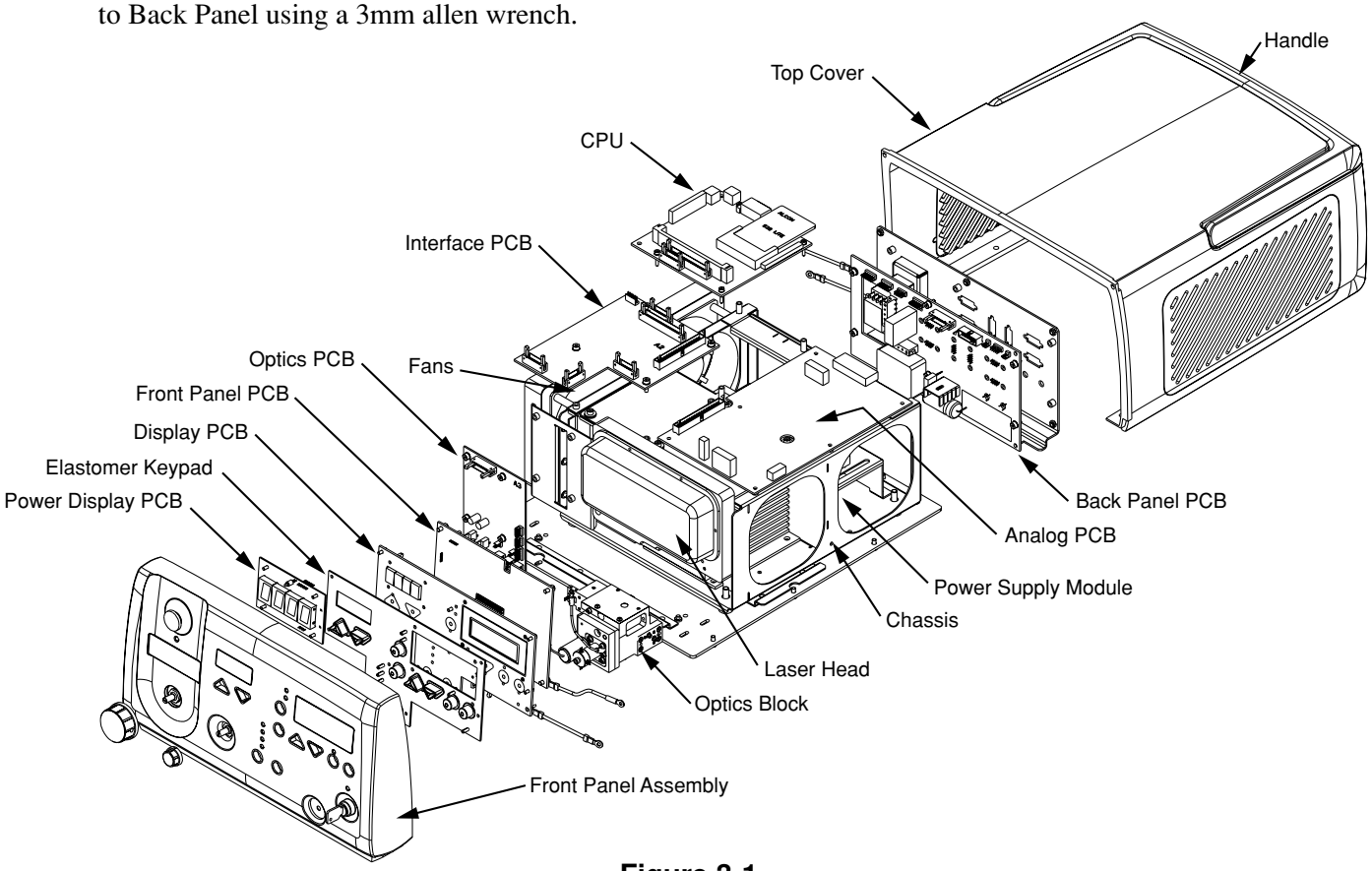


Figure 3-1
Exploded View of the EyeLite® Laser

3 Removal of Handle

3.1 Remove Top Cover per step 1.

3.2 Remove two screws (M4X16) and washers securing handle to Top Cover using a flat head screwdriver. Remove handle.

4 Installation of Handle

4.1 Attach handle to Top Cover.

4.2 Install two screws (M4X16) and washers using a flat head screwdriver.

4.3 Install Top Cover per step 2.

5 Removal of Front Panel Assembly

5.1 If necessary remove Top Cover per step 1.

NOTE: To remove Front Panel without removing Top Cover, remove only the two screws (M4X8) securing Top Cover to Front Panel.

5.2 Position unit to allow access to bottom front.

5.3 Remove two screws (M4X8) securing Front Panel to base plate using a 3mm allen wrench.

5.4 Remove four screws (M4X8) securing Front Panel brackets to base plate using a 3mm allen wrench. Return unit to its normal position on the table.

5.5 Gently slide Front Panel forward and disconnect cables from Front Panel PCB at A4J1, A4J3, and A4J4.

5.6 Remove ground straps connected from Front Panel PCB to Front Panel brackets using a 7mm nut driver or an open end wrench.

6 Installation of Front Panel Assembly

6.1 Reconnect following cables: W22 to A4J1; W15 to A4J3; and W4 to A4J4.

6.2 Perform "Setting Illumination of Keypad" procedure in Section Five.

6.3 Attach ground straps from Front Panel Assembly to Front Panel brackets using a 7mm nut driver or 7mm wrench.

6.4 Position unit to allow access to bottom front.

6.5 Place Front Panel onto base plate, align four holes in Front Panel brackets with holes in base plate. Install four screws securing Front Panel brackets to base plate.

6.6 Install two screws securing Front Panel to base plate.

6.7 Install Top Cover per step 2.

NOTE: If Top Cover was not removed install two M4X8 screws securing Top Cover to Front Panel.

7 Disassembly of Front Panel Assembly

7.1 Remove Front Panel Assembly per step 5.

7.2 Remove hex nut (M3X5) that secures ground straps to top post on Front Panel Bracket using a 7mm nut driver or an open end wrench.

7.3 Remove three screws (M4X8) securing each Front Panel bracket (2) to Front Panel Assembly using a 3mm allen wrench.

7.4 Disconnect following connections from Front Panel PCB: A4J2, A4J5, A4J6, A4J7, A4J8, A4J9, A4J11.

7.5 Remove four screws (M4X8) securing Front Panel PCB to Front Panel Assembly using a 3mm allen wrench. Remove Front Panel PCB and ground strap, and set aside.

7.6 Disconnect following connections from Power Display PCB: A5J2 and A5J3 (Panic Switch and Power Pot).

7.7 Remove four screws (M3X8) securing Power Display PCB to Front Panel Assembly using a 2.5mm allen wrench. Remove Power Display PCB and set aside.

7.8 Remove eight screws (M3X8) securing Keypad PCB to Front Panel Assembly using a 2.5mm allen wrench. Remove Keypad PCB and Elastomer Keypad, and set aside.

7.9 Remove two screws (M3X8) securing Fiber Aperture Bracket to Front Panel Assembly using a 2mm allen wrench. Remove Fiber Aperture Bracket and Fiber Aperture, and set aside.

7.10 Loosen set screws securing Power Pot knob to Power Pot using a 2mm allen wrench. Remove knob and spring, and set aside.

7.11 Remove retaining nut securing Power pot to Front Panel Assembly. Remove Power Pot and set aside.

7.12 Loosen set screws securing Aiming Beam knob to Aiming Beam pot. Remove knob and set aside.

7.13 Remove retaining nut securing Aiming Beam pot to Front Panel Assembly. Remove Aiming Beam Pot and set aside.

8 Assembly of Front Panel Assembly

8.1 Install Aiming Beam Pot into Front Panel Assembly. Rotate pot fully counter-clockwise. Secure Aiming Beam Pot to Front Panel Assembly with retaining nut.

8.2 Install Power Pot into Front Panel Assembly. Rotate Power Pot fully counter-clockwise. Secure Power Pot to Front Panel Assembly with retaining nut.

8.3 Install Aiming Beam Knob on Aiming Beam Pot. Rotate knob until position indicator is in 8 o'clock position. Secure Aiming beam Knob to Aiming Beam Pot with set screws.

8.4 Install Power Pot Knob and spring on Power Pot. Secure Power Pot knob to Power Pot by tightening set screws. Be sure to leave a gap approximately 0.10 inch between knob and Front Panel Assembly.

8.5 Secure Fiber Aperture and Fiber Aperture Bracket to Front Panel Assembly using two screws (M3X8).

8.6 Secure Elastomer Keypad and Keypad PCB to Front Panel Assembly using eight screws (M3X8).

8.7 Secure Power Display PCB to Front Panel Assembly using four screws (M3X8).

8.8 Connect following cables to Power Display PCB: W23 to A5J2 and W24 to A5J3.

8.9 Secure Front Panel PCB and ground strap to Front Panel Assembly using four screws (M4X8).

8.10 Connect following cables to Front Panel PCB: W28 to A4J2, W30 to A4J5, W27 to A4J6, W26 to A4J7, W25 to A4J8, W29 to A4J9, W34 to A4J11 (install on pins 2 and 3).

8.11 Secure each Front Panel Bracket to Front Panel Assembly using three screws (M4X8).

8.12 Attach ground straps from Keypad PCB and Front Panel PCB to top post of Front Panel Bracket.

8.13 Install Front Panel Assembly per step 6.

9 Removal of Back Panel Assembly

9.1 Remove Top Cover per step 1.

9.2 Position unit to allow access to bottom rear.

9.3 Remove three screws (M4X8) securing Back Panel to base plate using a 3mm allen wrench.

9.4 Remove two screws (M4X6) securing ground straps to chassis using a 3mm allen wrench.

9.5 Disconnect following connections from Back Panel PCB: A1J1, A1J2, A1J3, A1J4, A1J6, A1J8, A1J9, A1J10, and A1J17.

9.6 Use a 7mm nut driver or 7mm wrench to remove three ground straps from Back Panel assembly and power supply to engine chassis.

10 Installation of Back Panel Assembly

10.1 Reconnect following cables: W1 to A1J1, W2 to A1J2, W3 to A1J3, W4 to A1J4, W6 to A1J6, W8 to A1J8, W9 to A1J9, W10 to A1J10, and W33 to A1J17.

10.2 Attach three ground straps from Back Panel assembly and power supply to engine chassis using a 7mm nut driver or 7mm wrench.

10.3 Attach two ground straps to chassis using two screws (M4X6).

10.4 Install three screws (M4X8) securing Back Panel assembly to base plate.

10.5 Install Top Cover per step 2.

11 Disassembly of Back Panel Assembly

11.1 Remove Top Cover per step 1 and Back Panel Assembly per step 9.

11.2 Disconnect A1J5 from Back Panel PCB.

11.3 Remove six screws (M4X8) that secure Back Panel PCB to rear panel bracket using a 3mm allen wrench. Remove Back Panel PCB and set aside.

12 Assembly of Back Panel Assembly

12.1 Place Back Panel PCB on rear panel bracket and align holes of PCB with stand offs of bracket. Secure Back Panel PCB using six screws (M4X8).

12.2 Connect cable W5 from power entry module to A1J5 on Back Panel PCB.

12.3 Install Back Panel Assembly per step 10 and Top Cover per step 2.

13 Removal of Power Supplies

13.1 Remove Top Cover per step 1 and Back Panel Assembly per step 9.

13.2 Disconnect 9 pin connector from JPWR2 on Analog PCB.

13.3 Use a phillips head screwdriver to remove screws (#M4) securing two black AWG 10 wires to Analog PCB at PVDS1.

13.4 Use a phillips head screwdriver to remove screws (#M4) securing two green AWG 10 wires to Analog PCB at PLD1.

13.5 Remove two ground straps from power supply to chassis using a 7mm nut driver.

13.6 Loosen four captive screws securing power supplies to chassis using a 7mm nut driver.

13.7 Slide Power Supplies out from open side of chassis.

14 Installation of Power Supplies

14.1 Slide Power Supply Assembly into open side of chassis. Slide it all the way into chassis, until assembly touches back plate.

14.2 Attach power supplies to chassis by tightening four captive screws.

14.3 Attach two ground straps from power supply to chassis using hex nuts (#M4).

14.4 Attach two Green 10 AWG wires to Analog PCB at PLD1 using two screws (#M4).

14.5 Attach two Black 10 AWG wires to Analog PCB at PVDS using two screws (#M4).

14.6 Connect 9 pin connector from Power Supply to JPWR2 on Analog PCB.

14.7 Attach Back Panel assembly per step 10 and Top Cover per step 2.

15 Removal of Pigtailed Fan Assembly

15.1 Remove Top Cover per step 1.

15.2 Disconnect fan power connector from Analog PCB: JFAN1 (Power supply fan) or JFAN2 (Heat sink fan).

NOTE: If necessary, mark JFAN connectors to aid in installation.

15.3 Remove cable from two cable mounts attached to underside of chassis beneath the CPU PCB. A standard screwdriver may aid in releasing the cable mount.

15.4 Remove eight 1 $^{7}/_{8}$ inch screws that mount fan assembly to side of chassis using a phillips head screwdriver.

15.5 Remove fan(s) from Fan Assembly.

16 Installation of Pigtailed Fan Assembly

16.1 Insert four $^{15}/_{16}$ inch standoffs into four mounting holes of each Pigtailed Fan.

16.2 Install Pigtailed fan to chassis using eight 1 $^{7}/_{8}$ inch screws.

NOTE: Mount fan with wires facing center of chassis (between heat sink and power supplies), and arrows on side of fan facing away from chassis. Mount fan guard with arc on grid of guard positioned vertically and facing sides of fan.

16.3 Connect wires from Pigtailed fan assembly to connectors on Analog PCB: JFAN1 (Power supply fan), JFAN2 (Heat sink fan). Route cables through cable mounts located on underside of chassis.

16.4 Install Top Cover per step 2.

17 Removal of Analog PCB

17.1 Remove Top Cover per step 1.

17.2 Remove 16 pin multi-colored ribbon cable from Head PCB.

17.3 Connect a jumper wire from test point on Head PCB (ESD TP) to any ground test point on Analog PCB.

17.4 Remove two screws (#M4) securing green and black AWG 10 wires at P1 and P4 on Analog PCB

17.5 Attach two lugs from step 17.4 together (green and black cables) making sure there is a good conductive contact.

17.6 Disconnect jumper wire installed in step 17.3.

17.7 Disconnect connector from JPWR1 and JPWR2 on Analog PCB.

17.8 Remove two black AWG 10 wires at PVDS1 on Analog PCB using a phillips head screwdriver.

17.9 Remove two green AWG 10 wires at PLD1 on Analog PCB using a phillips head screwdriver.

17.10 Disconnect fan assembly connectors from: JFAN1 (Power supplies fan) and JFAN2 (Heat sink fan).

NOTE: If necessary, mark JFAN connectors to aid in installation.

17.11 Remove 50 pin connector JCDH2 from Analog PCB (to Interface PCB).

17.12 Remove three connectors JCDH1, JHS1, and JTEC1 from Analog PCB.

17.13 Remove six screws (#M4) securing Analog PCB to chassis and remove Analog PCB using a phillips head screwdriver.

18 Installation of Analog PCB

18.1 Align six holes in Analog PCB with pem nuts on chassis and attach Analog PCB to chassis using six screws (#M4).

18.2 Connect connectors JHDS1 and JTEC1 from Head PCB to Analog PCB.

18.3 Connect 50 pin connector JCDH2 from Interface PCB to Analog PCB.

18.4 Connect fan assembly connectors to: JFAN1 (Power supplies fan) and JFAN2 (Heat sink fan).

18.5 Attach two green 10 AWG wires to Analog PCB at PLD1 using screw (#M4).

18.6 Attach two black 10 AWG wires to Analog PCB at PVDS1 using screw (#M4).

18.7 Connect connectors from power supply to JPWR1 and JPWR2 on Analog PCB.

18.8 Connect a jumper wire from test point on Head PCB (ESD TP) to any ground test point on Analog PCB.

18.9 Remove screw connecting black and green wires together.

18.10 Attach green cable to P1 and black cable to P4 on Analog PCB using screws (#M4).

18.11 Disconnect jumper wire installed in step 18.8.

18.12 Attach 16 pin ribbon cable (connected to connector JHD1 on Analog PCB) to Head PCB ribbon connector.

18.13 Install Top Cover per step 2.

19 Removal of CPU PCB

19.1 Remove Top Cover per step 1.

19.2 Disconnect cables from J1A, H2, COM1, and COM2 on CPU PCB.

19.3 Remove four screws securing CPU PCB to chassis using a 2.5mm allen wrench. Remove CPU PCB. **NOTE: There are four plastic washers between CPU PCB and chassis which may fall out when the CPU PCB is removed.**

20 Installation of CPU PCB

20.1 Secure CPU PCB to chassis using four 2.5 mm hex head screws. Ensure that the four plastic washers are replaced between CPU PCB and chassis.

20.2 Connect following cables to CPU PCB: W13 to H2, W10 to J1A, W22 to COM2, W3 to COM1.

20.3 Perform "Resetting CPU PCB" in Section Five.

21 Removal of Interface PCB

21.1 Remove Top Cover per step 1.

21.2 Disconnect cables from A2J1, A2J2, A2J3, A2J4, A2J5, A2J6, and A2J7 on Interface PCB.

21.3 Remove four screws (M4X12) securing Interface PCB to chassis using a 3mm allen wrench.

22 Installation of Interface PCB

22.1 Place Interface PCB on chassis. Align four holes over stand offs and attach Interface PCB to chassis using four screws (M4X12).

22.2 Reconnect following cables: W11 to A2J1, W12 to A2J2, W13 to A2J3, W14 to A2J4, W15 to A2J5, W1 to A2J6, and W9 to A2J7 to Interface PCB.

22.3 Install Top Cover per step 2.

23 Removal of Optics PCB

23.1 If necessary remove Top Cover per step 1.

23.2 Remove Front Panel assembly per step 5.

23.3 Disconnect cables from A3J1 through A3J7 and A3J9 on Optics PCB.

23.4 Remove four screws (M3X8) securing Optics PCB to mounting bracket using a 3mm allen wrench.

24 Installation of Optics PCB

24.1 Place Optics PCB on mounting bracket. Align four holes with center of standoffs and attach Optics PCB to mounting bracket using four screws (M3X8).

24.2 Connect following cables: W16 to A3J1, W17 to A3J2, W18 to A3J3, W19 to A3J4, W31 to A3J5, W14 to A3J6, W31 to A3J7, and W33 to A3J9 to Optic PCB.

24.3 Install Front Panel assembly per step 6.

24.4 If necessary install Top Cover per step 2.

25 Removal of Optics Block

25.1 If necessary remove Top Cover per step 1.

25.2 Remove Front Panel assembly per step 5.

25.3 Disconnect cables from A3J1 through A3J5, A3J7, and A3J9 on Optics PCB.

25.4 Remove three screws (M3X12) securing Optics Block to Laser Head using a 2.5mm allen wrench (see Figure 3-2). Remove Optics Block.

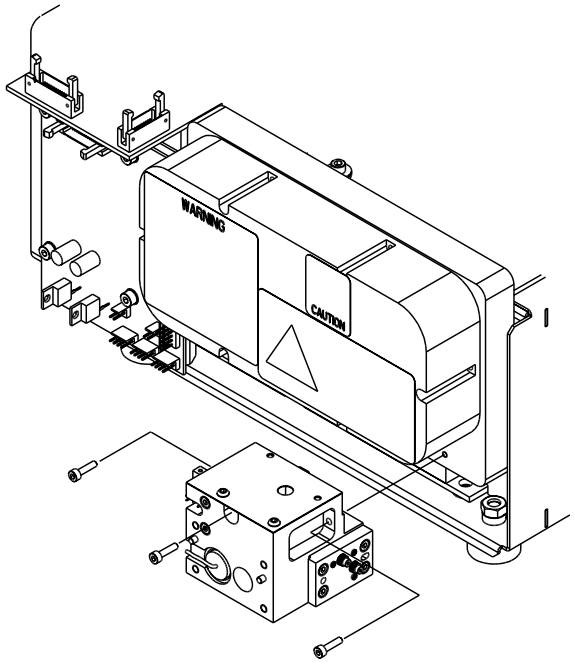


Figure 3-2
Three Screws Securing Optics Block to Laser Head

26 Installation of Optics Block

26.1 Align Optics Block with pins on Laser Head.

26.2 Attach Optics Block to Laser Head using three screws (M3X12).

26.3 Connect following cables: W16 to A3J1, W17 to A3J2, W18 to A3J3, W19 to A3J4, W31 to A3J5, W31 to A3J7, and W33 to A3J9 to Optic PCB.

26.4 Install Front Panel assembly per step 6.

26.5 Install Top Cover per step 2.

27 Removal of Motor/Shutter Assembly from Optics Block

27.1 Remove Optics Block per step 25.

27.2 Use a 2.5mm allen wrench to remove the two screws (M3X20) with spring washers that hold the Port Mounting Plate and Chimney assembly onto the Optics Base Plate (see Figure 3-3). Pull the assembly away from the Optics Block and set aside.

NOTE: A steel ball is held in place between optics base plate and the port mounting plate. Be prepared to catch it when the assemblies are pulled apart.

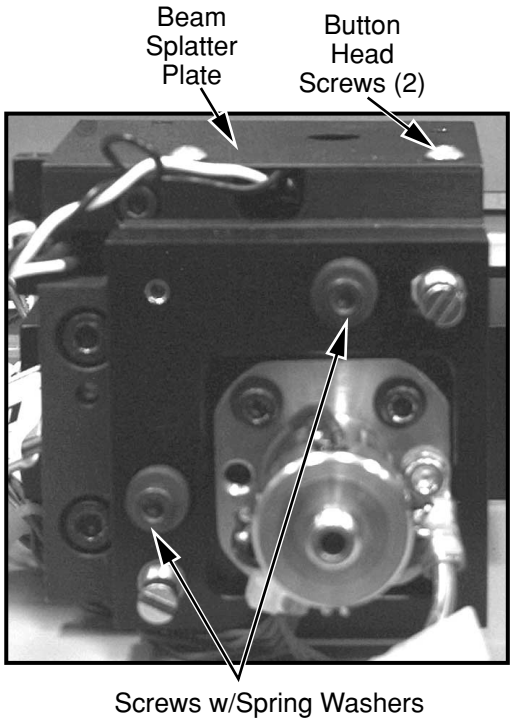


Figure 3-3
Two Screws Securing Port Mounting Plate/ Chimney to Optics Base Plate

27.3 Remove the four screws (M4X10) securing the Optics Base Plate to the Optics Block main body using a 3mm allen wrench (see Figure 3-4). Set plate aside.

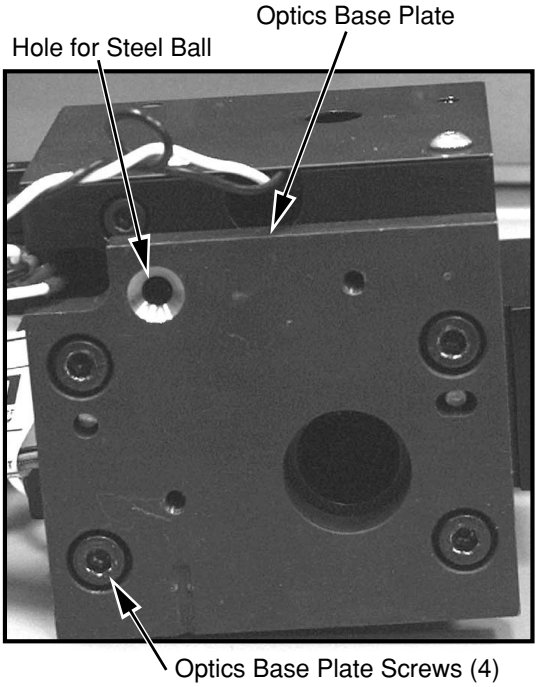


Figure 3-4
Four Screws Securing Optics Base Plate to Optics Block Main Body

27.4 Remove two button head screws (M3X6) securing beam splatter plate to Optics Block (see Figure 3-3) .

27.5 Remove two screws (M3X12) securing Motor/ Shutter assembly to Optics Block (see Figure 3-5). Slide Motor/Shutter assembly out of Optics Block.

NOTE: Refer to assembly drawings in Section Seven for additional disassembly information.

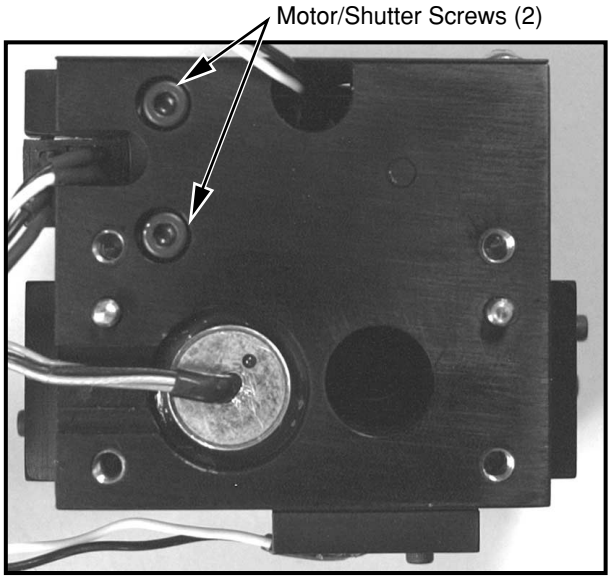


Figure 3-5
Two Screws Securing Motor/Shutter Assembly to Optics Block

28 Installation of Motor/Shutter Assembly

28.1 Secure Motor/Shutter assembly into Optics Block using two screws (M3X12).
NOTE: Ensure top of Motor/Shutter assembly is flush with top of optics block.

28.2 Attach Beam Splatter Plate to top of Optics Block using two button head screws.

28.3 Replace the Base Plate onto the front of the Optics Block, and secure with four screws.

CAUTION

Do not pinch Aiming Diode wires when installing Base Plate.

28.4 Replace the Port Mounting Plate and Chimney assembly onto the Optics Base Plate with steel ball in place between the two plates. Secure with two screws and spring washers.

28.5 Replace Optics Block per step 26.

29 Removal of Aiming Diode from Optics Block

CAUTION

The diode aiming laser is extremely sensitive to ESD. Observe ESD handling techniques when changing or inspecting the diode aiming laser.

29.1 Remove Optics Block per step 25.

29.2 Use a 2.5mm allen wrench to remove the two screws (M3X20) with spring washers that hold the Port Mounting Plate and Chimney assembly onto the Optics Base Plate (see Figure 3-3). Pull the assembly away from the Optics Block and set aside.
Note: A steel ball is held in place between optics base plate and the port mounting plate. Be prepared to catch it when the assemblies are pulled apart.

29.3 Remove the four screws (M3X10) securing the Optics Base Plate to the Optics Block main body using a 3mm allen wrench (see Figure 3-4). Set plate aside.

29.4 Use a 1.5mm allen wrench to slightly loosen the two set screws M3X4 that secure the diode element and slide the complete element out from the body of the Optics Block (see Figure 3-6).

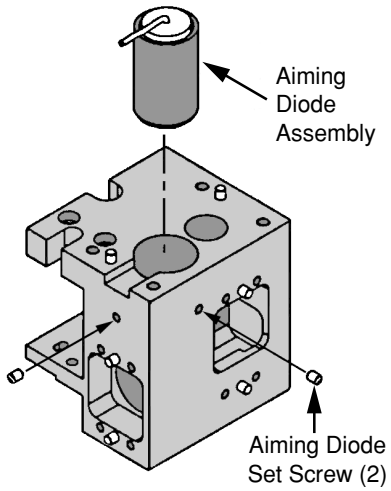


Figure 3-6
Removal of Aiming Diode Assembly

30 Installation of Aiming Diode

30.1 Slide Aiming Diode in place and secure with two 1.5mm set screws.

30.2 Replace the Base Plate onto the front of the Optics Block, and secure with four screws.

CAUTION

Do not pinch Aiming Diode wires when installing Base Plate.

30.3 Replace the Port Mounting Plate and Chimney assembly onto the Optics Base Plate with steel ball in place between the two plates. Secure with two screws and spring washers.

30.4 Replace Optics Block per step 26.

31 Removal of Laser Head

31.1 Remove Top Cover per step 1, Front Panel assembly per step 5, and Back Panel assembly per step 9.

31.2 Disconnect 16 pin ribbon cable attached to Head PCB (leave cable attached to Analog PCB).

31.3 Remove ground cable from chassis at Laser Head using a 3mm allen wrench.

31.4 Connect a jumper wire from test point on head PCB (ESD TP) to any ground test point on Analog PCB.

31.5 Use a phillips head screwdriver to remove two screws (#M4) securing green and black AWG 10 wires at P1 and P4 on Analog PCB.

31.6 Attach two cable lugs in step 31.5 together (green and black cables) making sure there is a good conductive contact.

31.7 Disconnect jumper wire installed in step 31.4.

31.8 Remove Interface PCB per step 21.

31.9 Remove six screws securing Laser Head to top of chassis using a $^{3}/_{32}$ allen wrench (see Figure 3-7).

31.10 Disconnect cables from A3J1 through A3J5, A3J7, and A3J9 on Optics PCB.

31.12 Remove three screws (M3X8) securing bracket which holds Optics PCB to chassis (see Figure 3-8). Remove Optics PCB and bracket assembly and set it aside.

31.13 Remove three screws (M3X12) securing Optics block to Laser Head using a 2.5mm allen wrench (see Figure 3-2). Cover output port to protect optics from dust and set aside.

31.14 Gently turn system on its side (fan side facing up) and use a $^{3}/_{16}$ inch allen wrench to remove four screws (#4M) securing base plate to chassis.

31.15 Remove ground cable from chassis to base plate using a 7mm wrench.

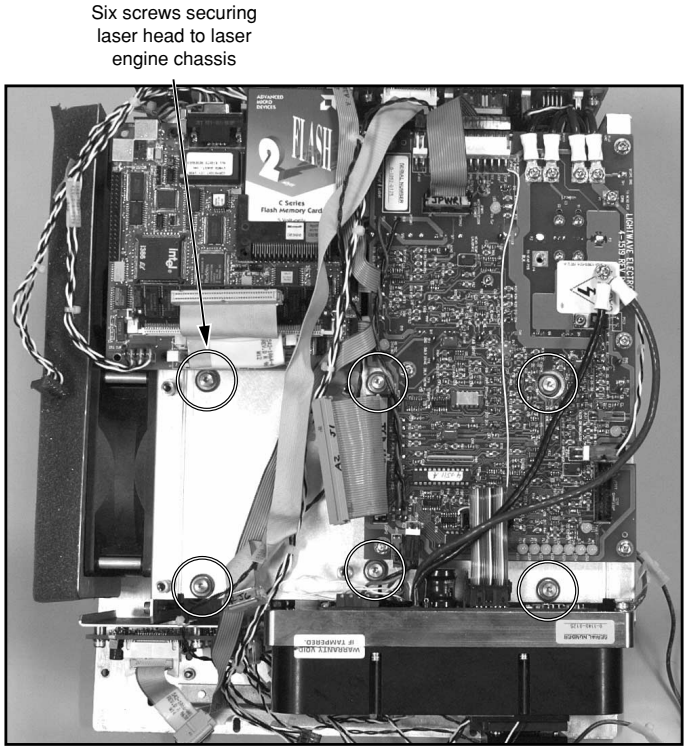


Figure 3-7
Six Screws Securing Laser Head to Chassis

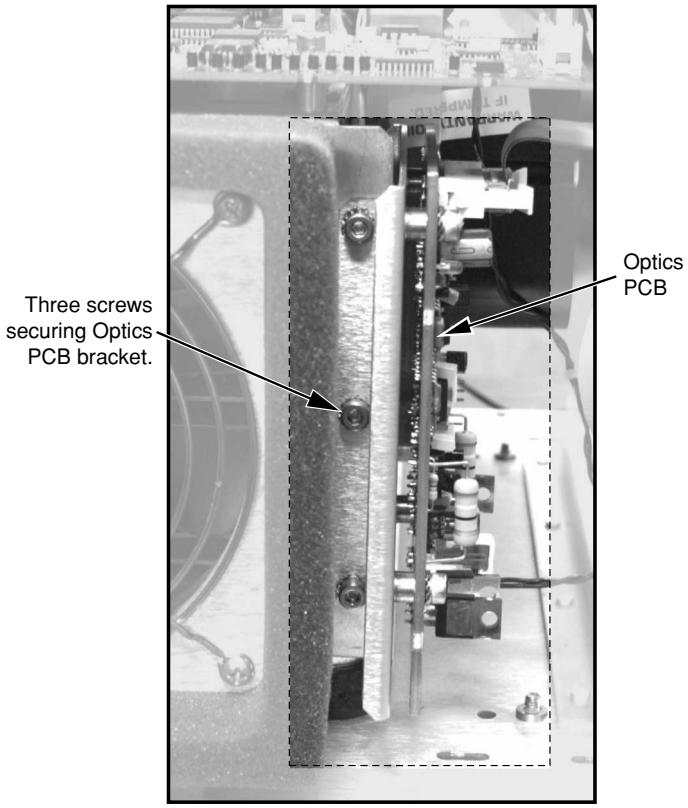


Figure 3-8
Three Screws securing Optics PCB Bracket to Chassis

31.16 Remove six screws (M3X8) and washers securing Laser Head to bottom of chassis through blue shock mounts using a $^{3}/_{32}$ allen wrench. Return system to its normal position.

31.17 Slide head assembly up and out of chassis enough to remove connectors JTEC1 and JHS1 from Analog PCB and continue removing Laser Head assembly (rock assembly back and forth slowly to facilitate removal).

32 Installation of Laser Head Assembly

32.1 Gently ease Laser Head into laser chassis until it meets slight resistance (which occurs about 1" back from complete installation).

32.2 Attach connectors from Head PCB to JTEC1 and JHS1 on Analog PCB.

32.3 Use a screwdriver to guide heat fins of Laser Head assembly over blue shock mounts until Laser Head is inserted into chassis. It is normal for the blue shock mounts to cause resistance while inserting the Laser Head assembly.

32.4 Install six screws and washers through blue shock mounts to secure Laser Head to top of chassis.

32.5 Connect a jumper wire from test point on Head PCB (ESD TP) to any ground test point on Analog PCB.

32.6 Separate two cables (black and green) that are tied together.

32.7 Attach black cable to P1 and green cable to P4 on Analog PCB using two screws (#M4).

32.8 Disconnect jumper wire installed in step 32.5.

32.9 Attach 16 pin ribbon cable from JHD1 on Analog PCB to Head PCB ribbon connector.

32.10 Attach ground cable from chassis to Laser Head using a screw (M4X8).

32.11 Secure Optics Block to Laser Head with three screws (M3X12) using a 2.5mm allen wrench.

32.12 Install three screws (M3X8) securing Optics PCB/bracket assembly to chassis.

32.13 Connect following cables: W16 to A3J1, W17 to A3J2, W18 to A3J3, W19 to A3J4, W31 to A3J5, W31 to A3J7, and W33 to A3J9 to Optic PCB.

32.14 Install Interface PCB per step 22.

32.15 Gently turn system on its side (fan side up) and attach Laser Head to chassis by placing six screws (M3X8) and washers through blue shock mounts. Tighten screws.

32.16 Place base plate close enough to chassis to attach ground cable from chassis to base plate.

32.17 Place base plate against chassis, align holes with standoffs and attach base plate to chassis using four screws (#4M). Return system to its normal position.

32.18 Install Back Panel assembly per step 10, and Front Panel assembly per step 6.

32.19 Connect a computer terminal to the service port on the EyeLite® rear panel. Turn on the computer and start the communications software. Use the following communications protocol: computer or ASCII terminal with RS232 capability; requires 9600 baud, 8 data bits, 2 stop bits, no parity.

32.20 Turn the EyeLite® main power switch ON and then turn the keyswitch to the ON position.

32.21 Start the Service Subroutine, enter the password (ABBMST), and select option 3- "Change Parameters" sub-menu.

32.22 Select option 1 - "Set Laser Head Serial Number" and press [Enter] to input the Laser Head serial number. **NOTE: Be sure to input the serial number from the label on the side of the chassis, not the serial number from the label on the laser head (see Figure 3-9).**

32.23 Perform the Calibration Procedure in Section Five of this manual.

32.24 Install Top Cover per step 2.

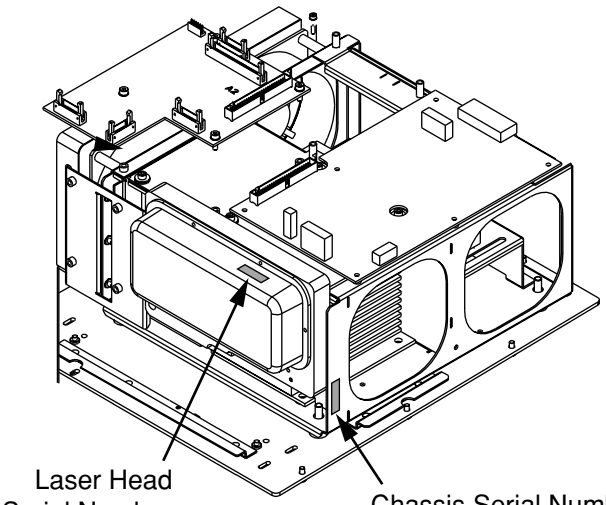


Figure 3-9
Location of Serial Number
Used to Set the Laser Head Serial Number

SECTION FOUR
MAINTENANCE AND TROUBLESHOOTING

This section of the manual contains information to assist the Field Engineer in troubleshooting and repairing the system. Section contents:

- Optical Alignment
- Calibration
- Setting the Terminal Efficiencies
- Resetting the CPU PCB
- Keypad Illumination Adjustment
- Changing System Parameters
- Troubleshooting Tables and Flowcharts
- Test Point Descriptions

OPTICAL ALIGNMENT

This procedure outlines the steps required to perform a complete inspection and alignment of the EyeLite® optics. It is divided into five sections as follows:

1 - Laser Engine Inspection
2 - Laser Head Inspection/Replacement
3 - Inspection of the Optics Block
4 - Fiber Alignment
5 - Delivered Power Calibration

SPECIAL TOOLS

- Computer or ASCII terminal with RS232 capability; requires 9600 baud, 8 data bits, 2 stop bits, no parity
- Aperture Tools: PN 995-5420-002, 003, 004, and 005
- Null modem cable / Adapter
- Power Meter, Thermopile type (Coherent 210 or equivalent)
- Laser Safety Goggles (OD4 or above, at 532 nm wavelength)
- Optics cleaning kit, including spectroscopic grade methanol, lens paper and air blower

1 LASER ENGINE INSPECTION

WARNING!

Laser light emitted from the fiber and laser head is powerful enough to cause serious eye or skin damage. Maintenance should be performed only by properly trained personnel, following established guidelines for laser safety. The use of protective eye wear is mandatory.

1.1 Connect computer terminal to the service port on the EyeLite® rear panel. Turn on the computer and start the communications software. Refer to the Special Tools section for communications protocol.

1.2 Install an Endo probe. Direct the distal end of the probe to the center of the power meter head.

1.3 Turn on the main power switch and then turn the keyswitch to the ON position.

1.4 On the computer terminal, enter the Service Mode by typing the password ABBMST. Read the warning. Press [Z] to select "Select System Parameters." Note the slit lamp terminal efficiency. Press [X].

1.5 Press [4] to select “Set Terminal Efficiency”, then press <Enter> to continue when prompted.

1.6 Enter 700mW for slit lamp efficiency, exit Service Mode, then restart the EyeLite®.

1.7 Select Slit Lamp mode, 500 mW, and exposure time = 2 seconds. Place system in Ready Mode.

1.8 Press Footswitch. The system should fire without an "Off Condition" or "Power Out of Range" error message.

- If an "Off Condition" or "Power Out of Range" message appears, calibrate the system, and repeat steps 1.1 - 1.8. If condition persists, proceed to step 1.9.
- If no errors appear, increase power by 100 mW and repeat step 1.8 for each setting until 1.7 W is reached. If no errors appear, repeat steps 1.1 - 1.6, enter the correct value for efficiency and proceed to step 4.

1.9 Change exposure time to 0.100 seconds and select repeat mode. Change the inter-pulse time to 100ms and increase the power setting to 500 mW.

1.10 Place the unit in ready mode. Press the footswitch and fire the laser for a minimum of 50 shots. While firing the unit, observe the power meter. Record the maximum value. This value should be at least 50% of the requested power setting.

NOTE: If an OFF condition or Power out of Range message appears, lower the requested value and repeat. Keep lowering the requested power until the laser will fire without an error.

- If the desired output is not obtained, the Laser Head may require replacement. Turn off the laser and proceed to step 2.
- If the desired laser power is obtained (or reasonably close), Increase power by 100 mW and repeat step 1.10 for each setting until 1.7 W is reached. If no errors appear, proceed to step 4 to test the fiber alignment.

2 LASER HEAD INSPECTION

CAUTION

There are no serviceable parts contained in the Laser Head assembly. It is imperative that no attempt is made to disassemble the Laser Head assembly.

2.1 Remove the Front Panel Assembly per Section Three.

2.2 Remove the three screws (M3Xl2) securing the Optics Block to the laser head (see Figure 4-1) using a 2.5mm allen wrench. Remove the two side screws first, then loosen the center bolt and pull the Optics Block from the Laser Head and set aside.

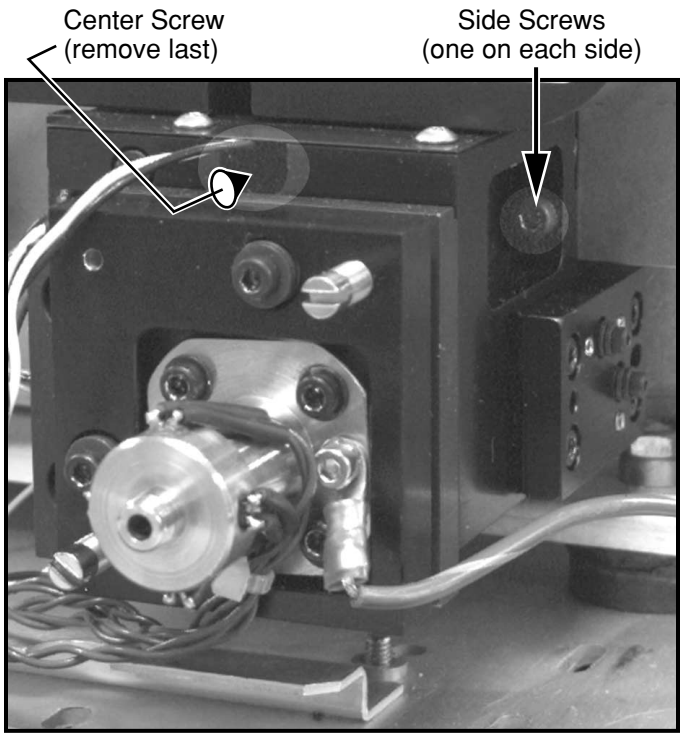


Figure 4-1
Removing the Optics Block to Check Laser Engine Output

2.3 Place the power meter on the base plate, facing up and in line with the laser output.

2.4 Select the Diode Current subroutine on the computer. Slowly raise the head current to maximum with the [U] key, and observe the power meter to determine the maximum output from the laser head. The output should be approximately 1.9 watts.

- If the desired laser power is obtained:
  - Press [X] to exit the subroutine.
  - Turn off the system using the key switch.
  - Proceed to step 3 to test the optics block.
- If the desired laser power is not obtained:
  - Press [X] to exit the subroutine, and turn off the unit.
  - Inspect the output window of the laser head for damage. Clean if needed, and retest.
  - If low power problem persists, the laser engine may need to be replaced if high power values are needed. To replace laser engine assembly refer to Section Three.
  - Return to step 1.

3 INSPECTION OF THE OPTICS BLOCK

NOTE: Problems of low delivered power may be the result of low transmission efficiency through the Optics Block resulting from unclean optics or poor mirror alignment. If transmission efficiency is not suspected, proceed to final alignment of the fiber optic (step 4).

3.1 Remove the two screws (M3X20) with spring washers that hold the Port Mounting Plate and Chimney assembly onto the Optics Base Plate (see Figure 4-2) using a 2.5mm allen wrench. Pull the assembly away from the Optics Block and set aside.

NOTE: A steel ball is held in place between optics base plate and the port mounting plate. Be prepared to catch it when the assemblies are pulled apart.

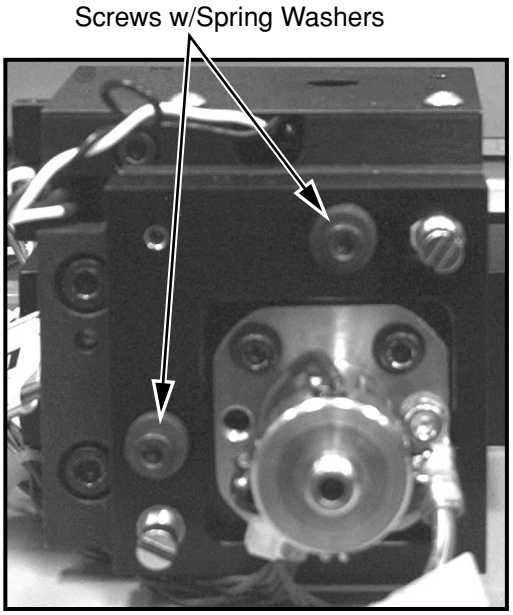


Figure 4-2
Removing Port Mounting Plate/Chimney from Optics Base Plate

3.2 Remove the four screws (M4X10) that secure the Optics Base Plate to the Optics Block main body using a 3mm allen wrench (see Figure 4-3). Set plate aside.

- If problems have been experienced with the aiming beam, the diode laser element may need to be replaced; go to step 3.3.
- If the aiming beam has been working properly, proceed to step 3.4 to continue inspection of the Optics Block assembly.

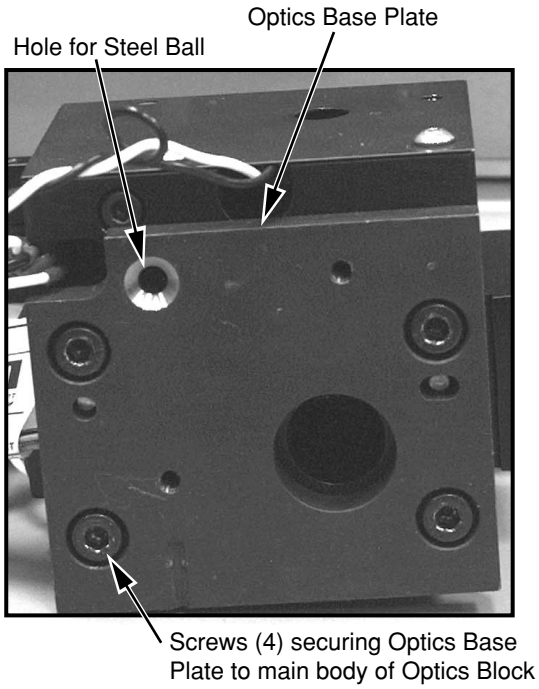


Figure 4-3
Removing Optics Base Plate from Main Body of Optics Block

CAUTION

The diode aiming laser is extremely sensitive to ESD. Observe ESD handling techniques when changing or inspecting the diode aiming laser.

3.3 Replacement of the Diode Element

3.3.1 Use a 1.5mm allen wrench to slightly loosen the two set screws M3X4 that secure the diode element and slide the complete element out from the body of the Optics Block (see Figure 4-4).

3.3.2 Slide the new element in place and secure with two set screws.

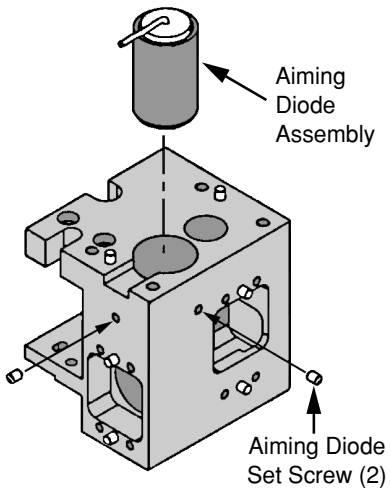


Figure 4-4
Replacement of the Aiming Diode Assembly

3.4 Remove four screws (M3X8) securing the first folding mirror assembly to the optics block body using a 2.5mm allen wrench (see Figure 4-5). Pull the mirror assembly out of the optics block.

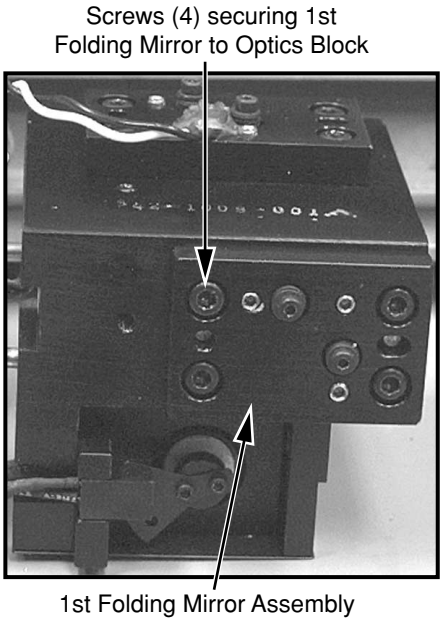
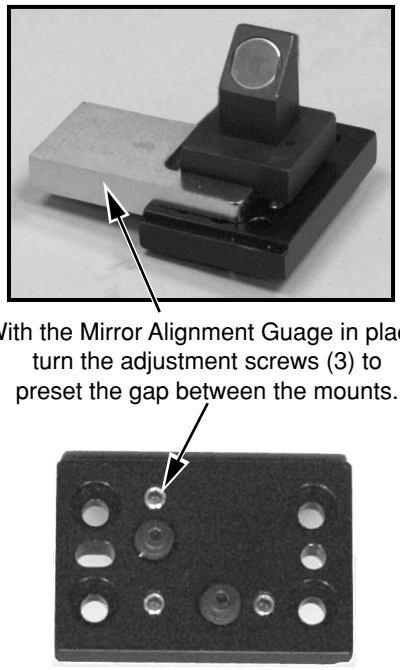


Figure 4-5
Removing First Folding Mirror Assembly from Optics Block

3.5 Inspect and clean the mirror with methanol as required. Use the mirror alignment gauge (PN 995-5420-004), to preset the gap between the two mounts (see Figure 4-6). Replace the assembly into the Optics Block, and secure with the four screws.



With the Mirror Alignment Guage in place, turn the adjustment screws (3) to preset the gap between the mounts.

Figure 4-6
Presetting the Mirror/Mounting Plate Gap

3.6 Remove the four screws (M3X8) securing the second folding mirror assembly to the Optics Block body using a 2.5mm allen wrench. Pull the mirror assembly out of the optics block. Inspect and clean the mirror with methanol as required. Use the mirror alignment gauge to preset the gap between the two mounts. Set the assembly aside.

3.7 Install the Aim Beam Aperture Tool (PN 995-5420-002) in the second folding mirror slot on the Optics Block and secure with the captive screws.

3.8 Turn on the system, enter the service mode, and wait for the aiming beam to illuminate.

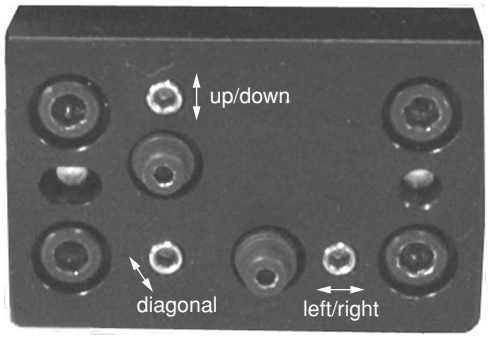
3.9 Adjust the first folding mirror adjustment screws to center the aiming beam within the Aperture Tool (see Figure 4-7). When complete, remove the Aperture Tool.

3.10 Replace the second folding mirror assembly into the body and secure with the four screws (M3X8).

CAUTION

Do not pinch Aiming Diode wires when installing the Surgical Beam Aperture Tool.

First Folding Mirror



Use the adjustment screws on the 1st folding mirror to center the beam within the aperture tool.
Hint: Center the beam reflection within the window, not the beam itself.

Aim Beam Aperture Tool

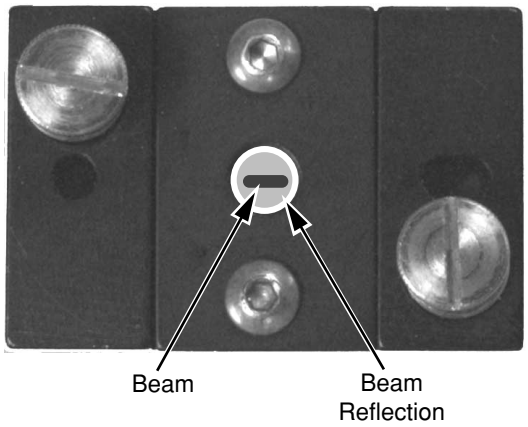


Figure 4-7
Aligning the Aiming Beam

3.11 Remove the four screws (M3X8) securing the Beam Splitter Mirror assembly to the optics block body using a 2.5mm allen wrench. Pull the mirror assembly out from the Optics Block.

3.12 Use the mirror alignment gauge (PN 995-5420-004) to preset the gap between the two mounts. Inspect and clean the mirror surface with methanol as required. Replace mirror into the Optics Block and secure with the four screws.

3.13 Install the Surgical Beam Aperture Tool (PN 995-5420-003) onto the front of the optics block and secure with the two captive screws.

3.14 Adjust the second folding mirror set screws to center the aiming beam within the Aperture Tool (see Figure 4-7). When complete turn off the system.

3.15 Place the Optics Block onto the Laser Head and secure with the three screws (M3Xl2).

3.16 Turn on the system, enter the Service Mode, and select the "Start Diode Service" subroutine.

3.17 Press the footswitch to open the shutter, and adjust the current using the [U] key to bring the green light to a comfortable viewing level to permit a centering alignment.

3.18 Adjust the beam splitter mirror set screws (1.5mm) to center the surgical beam on the aiming beam (see Figure 4-8). Remove the Surgical Beam Aperture tool when complete.

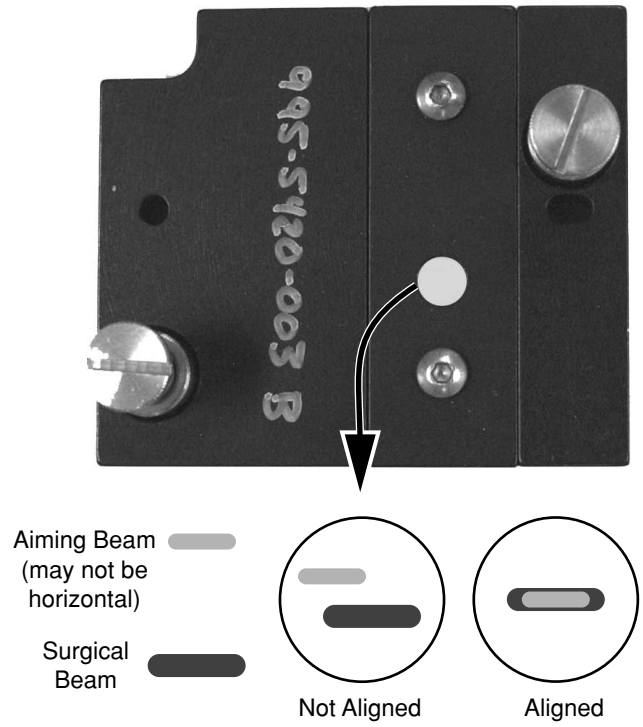


Figure 4-8
Aligning the Surgical Beam

3.19 Place a target approximately 1 meter directly in front of the beam path.

3.20 Press the footswitch and adjust the beam splitter mirror to align the green surgical beam on the aiming beam. Release the footswitch when complete.

3.21 Re-install the surgical beam aperture tool. Press the footswitch and verify that the two beams are coincident. If not, repeat steps 3.18 through 3.21.

NOTE: If alignment can not be obtained in a reasonable time, repeat steps 3.14 through 3.21.

CAUTION

Do not pinch Aiming Diode wires when installing the Surgical Beam Aperture Tool.

3.22 Replace the Base Plate onto the front of the Optics Block, and secure with the four screws.

3.23 Replace the Port Mounting Plate and Chimney assembly onto the Optics Base Plate with steel ball in place between the two plates. Secure with the two screws and spring washers.

3.24 Pre-adjust the Chimney assembly to the Optical Block Plate using guage PN 995-5420-005 (see Figure 4-9).

3.25 Temporarily loosen the four screws (M3Xl0) that secure the Port Chimney to the Mounting Plate using a 2.5mm allen wrench (see Figure 4-9).

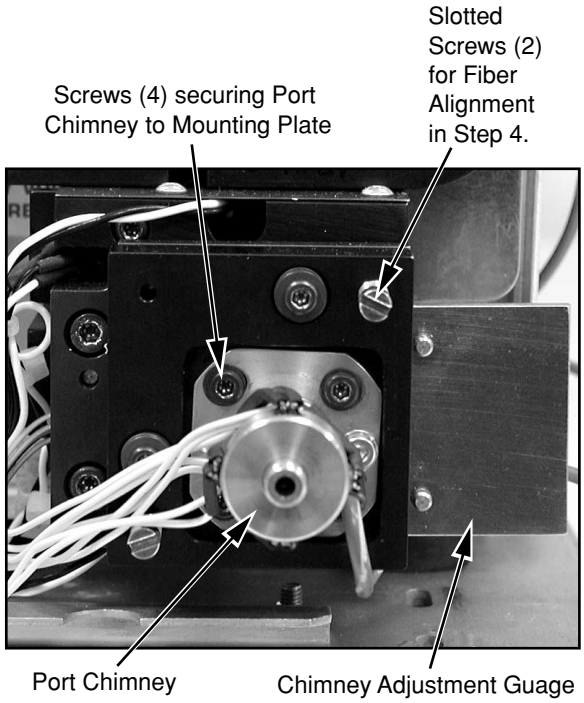


Figure 4-9
Aligning the Port Chimney

3.26 Apply a piece of cellophane tape to the output end of the chimney.

3.27 Position the chimney so as to completely center the aiming beam in the center of the chimney aperture, and lock in place with the four screws. Remove tape when complete.

4 FIBER ALIGNMENT

4.1 Connect a fiber optic cable to the terminal port.

4.2 Point the distal end of the cable towards a light surface (Paper works well).

4.3 While observing the output of the cable, adjust the slotted screws on the Port Mounting Plate (see figure 4-9) until the aiming beam is at maximum intensity.

NOTE: It is recommended to use an Endoprobe for preliminary alignment, and then progress to a Slit Lamp or LIO fiber optic cable.

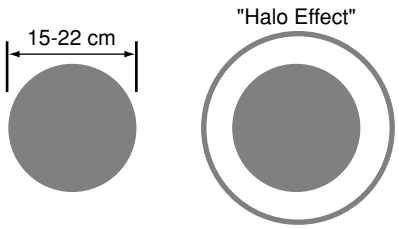


Figure 4-10
Beam Size After Adjustments to Maximize Transmission

4.4 Place the power meter at the output of the chimney port.

4.5 Select the Diode Service subroutine, and press the footswitch.

4.6 While observing the power meter, adjust the current to obtain 200 mW output power by pressing the [U] and [D] keys. Release the footswitch when complete.

4.7 Connect a test fiber optic to the chimney port and direct the distal output end into the power meter. Press the footswitch and note the transmitted output from the fiber on the power meter.

4.8 While observing the power meter, adjust the two slotted screws on the Port Mounting Plate (see Figure 4-9) to maximize the transmission efficiency.

After adjustment, the size of the beam must be between 15 and 22 cm (with no "halo effect") measured at 1 meter from fiber output, and the transmission efficiency must be greater than 85% (170mW). Refer to Figure 4-10. Release the footswitch when complete.

4.9 Press X to exit the subroutine.

NOTE: If the desired transmission is not obtained for the test fiber, the test fiber may be defective or the Optics Block may require inspection as detailed in step 3.

5 DELIVERED POWER CALIBRATION

5.1 Exposure Time Verification

5.1.1 Setup the system as shown in Figure 4-11.

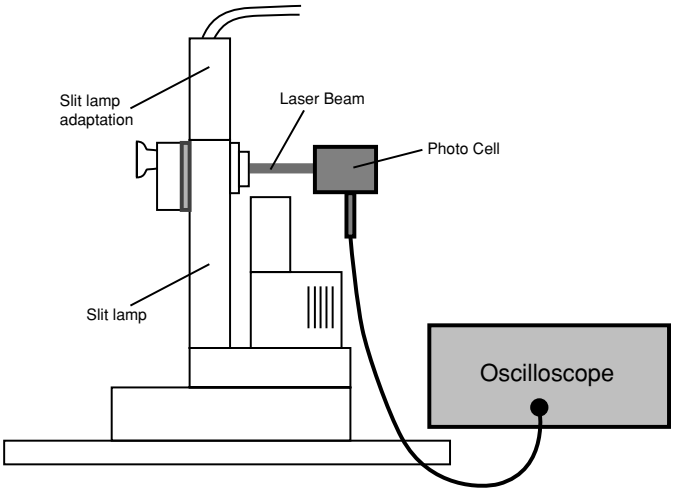


Figure 4-11
Exposure Time Configuration

5.1.2 Turn the system on.

5.1.3 Set spot size to 250 microns on the zoom. Adjust the distance between the slit lamp and photo cell to obtain a beam size of 2mm or more on the photo cell. Use aiming beam to determine spot size on the photo cell.

5.1.4 Set the exposure time to 0.01s and treatment beam power to minimum then press the Standby/Ready key.

5.1.5 Fire the laser and record the exposure time as determined from the oscilloscope.

5.1.6 Repeat steps 5.1.4 and 5.1.5 for each time value listed in Table 4-1.

NOTE: Table 4-1 is placed at the end of the Delivered Power Calibration procedure.

5.2 Slit Lamp Power Verification

5.2.1 Setup the system as shown in Figure 4-12.

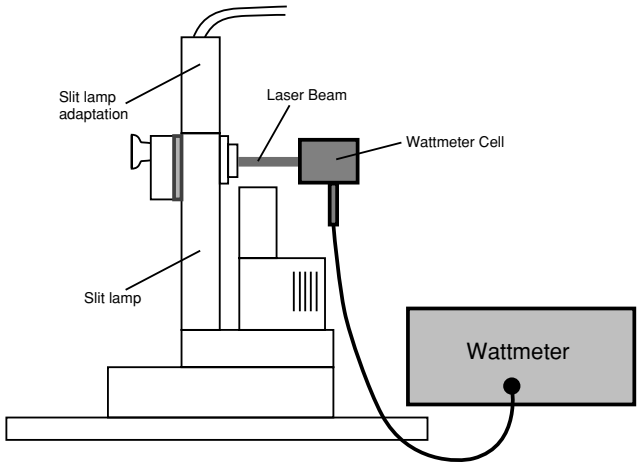


Figure 4-12
Slit Lamp Power Configuration

5.2.2 Set the exposure time to CW.

5.2.3 Set spot size to 250 microns on the zoom. Adjust the distance between the slit lamp and wattmeter cell to obtain a beam size of 2mm or more on the wattmeter cell. Use aiming beam to determine spot size on the wattmeter cell.

5.2.4 Set the treatment power to 0.03W then press the Standby/Ready key.

5.2.5 Fire the laser and record the wattmeter power reading into Table 4-1.

5.2.6 Repeat steps 5.2.4 and 5.2.5 for each value listed in the Slit Lamp section of Table 4-1.

5.3 Endoprobe Power Verification

5.3.1 Setup the system as shown in Figure 4-13.

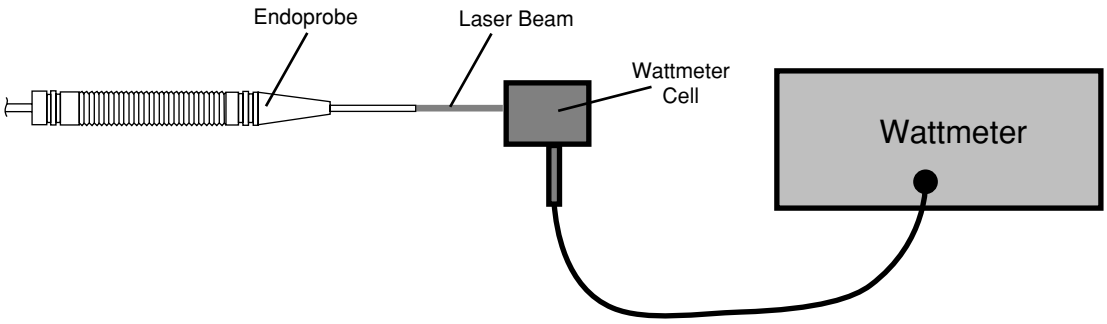


Figure 4-13
Endoprobe Power Configuration

5.3.2 Set the exposure time to CW.

5.3.3 Set the treatment power to 0.05 W then press the Standby/Ready key.

5.3.4 Fire the laser and record the power reading as determined from the Wattmeter.

5.3.5 Repeat steps 5.3.3 and 5.3.4 for each value listed in the Endoprobe section of Table 4-1.

5.4 LIO Power Verification

5.4.1 Setup the system as shown in Figure 4-14.

5.4.2 Set the exposure time to CW.

5.4.3 Set the treatment power to 0.1 W then press the Standby/Ready key.

5.4.4 Fire the laser and record the power reading as determined from the Wattmeter.

5.4.5 Repeat steps 5.4.3 and 5.4.4 for each value listed in the LIO section of Table 4-1.

5.5 Energy Matrix Completion (Table 4-1)

5.5.1 Complete the matrix by multiplying actual power by actual time and recording the result.

5.5.3 Ensure that all calculated results are within the values listed in each matrix cell. The listed values are ±15% of the set energy.

- If all calculated energy values are within the specified limits, the system calibration is OK.
- If any of the calculated energy results are not within the specified limits, the system may need calibration. Refer to the Calibration procedure following Table 4-1.

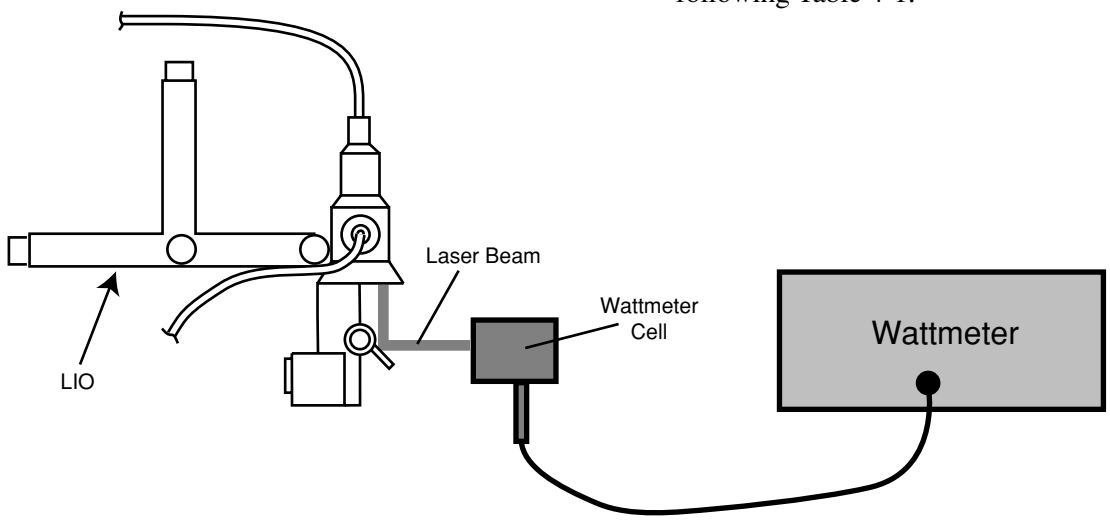


Figure 4-14
LIO Power Configuration

Table 4-1
Energy Matrix

	TIME ⇒ / POWER ⇓	0.01s [ ]	0.1s [ ]	0.3s [ ]	0.7s [ ]	1.5s [ ]
SLIT LAMP	0.03W [ ]	0.000255 [ ] 0.000345	0.00255 [ ] 0.00345	0.00765 [ ] 0.01035	0.0179 [ ] 0.0242	0.03825 [ ] 0.05175
	0.2W [ ]	0.0017 [ ] 0.0023	0.017 [ ] 0.023	0.051 [ ] 0.069	0.119 [ ] 0.161	0.225 [ ] 0.345
	0.5W [ ]	0.00425 [ ] 0.00575	0.0425 [ ] 0.0575	0.1275 [ ] 0.1725	0.2975 [ ] 0.4025	0.6375 [ ] 0.8625
	1.0W [ ]	0.0085 [ ] 0.0115	0.085 [ ] 0.115	0.255 [ ] 0.345	0.595 [ ] 0.805	1.275 [ ] 1.725
	1.7W [ ]	0.01445 [ ] 0.01955	0.1445 [ ] 0.1995	0.4335 [ ] 0.5865	1.0115 [ ] 1.3685	2.1675 [ ] 2.9325
ENDOPROBE	0.05W [ ]	0.000425 [ ] 0.000575	0.00425 [ ] 0.00575	0.001275 [ ] 0.01725	0.02975 [ ] 0.04025	0.06375 [ ] 0.08625
	0.2W [ ]	0.0017 [ ] 0.0023	0.017 [ ] 0.023	0.051 [ ] 0.069	0.119 [ ] 0.161	0.225 [ ] 0.345
	0.5W [ ]	0.00425 [ ] 0.00575	0.0425 [ ] 0.0575	0.1275 [ ] 0.1725	0.2975 [ ] 0.4025	0.6375 [ ] 0.8625
	1.0W [ ]	0.0085 [ ] 0.0115	0.085 [ ] 0.115	0.255 [ ] 0.345	0.595 [ ] 0.805	1.275 [ ] 1.725
	1.7W [ ]	0.01445 [ ] 0.01955	0.1445 [ ] 0.1995	0.4335 [ ] 0.5865	1.0115 [ ] 1.3685	2.1675 [ ] 2.9325
LIO	0.1W [ ]	0.00085 [ ] 0.00115	0.0085 [ ] 0.0115	0.0255 [ ] 0.0345	0.0595 [ ] 0.0805	0.1275 [ ] 0.1725
	0.2W [ ]	0.0017 [ ] 0.0023	0.017 [ ] 0.023	0.051 [ ] 0.069	0.119 [ ] 0.161	0.225 [ ] 0.345
	0.5W [ ]	0.00425 [ ] 0.00575	0.0425 [ ] 0.0575	0.1275 [ ] 0.1725	0.2975 [ ] 0.4025	0.6375 [ ] 0.8625
	1.0W [ ]	0.0085 [ ] 0.0115	0.085 [ ] 0.115	0.255 [ ] 0.345	0.595 [ ] 0.805	1.275 [ ] 1.725
	1.7W [ ]	0.01445 [ ] 0.01955	0.1445 [ ] 0.1995	0.4335 [ ] 0.5865	1.0115 [ ] 1.3685	2.1675 [ ] 2.9325

CALIBRATION PROCEDURE

After connecting the service computer to the EyeLite® and turning each system on, the computer will display the directions necessary to calibrate the system. The following instructions are intended to clarify these directions. **NOTE: The numbers used in the following screen displays are for reference only. Always use the actual numbers displayed on the service computer.**

1 Connect computer terminal to service port on the rear panel. Refer to the Special tools section for communications protocol.

2 Place the power meter head at the output of the chimney port.

3 Turn the main power switch ON and then turn the keyswitch to the ON position.

4 On the computer terminal, enter the service mode by typing the password ABBMST. Read the warning message and press [Enter] to continue. The following screen appears on the display:

```
                    OPHTHALAS® 532EyeLite®

                    Calibration Procedure

****************************************************************
*          WARNING                                             *
* It is operator's responsibility to comply with the safety regulations and *
* all personnel in the room must wear goggles with an OD 4 or above at 532nm. *
* By typing the password in the next step, you are agreeing that you have *
* read, understand, and will comply with the procedure         *
*                                                              *
* It is operator's responsibility to strictly follow the calibration *
* procedure. Non-compliance with this procedure could result in a *
* miscalibration of the system and patient injury. Each time a calibration *
* is done, the operator must verify that the system is in compliance with *
* the Energy Matrix provided in the Calibration Verification procedure. *
* If the system still does not comply with the Energy Matrix, the operator *
* must call Alcon Technical Services for assistance and discontinue using *
* the system.                                                  *
****************************************************************

        Software Version: 1.3        Build Date:Thu Jun 14 22:13:30 2001

        Hardware Compatible: 0x01

DA:ok, Shutter/C3:ok, MEMORY:ok, CPU:ok, TIMER:ok, EPROM:ok, ANALOG:ok, POWER:ok

CRC:32EF    If an error has occurred, this area of the service
            menu will indicate which subsystem has failed.

        Ophthalas® 532 EyeLite® Main Menu

        1 - Display System Parameters
        2 - Calibrate The System
        3 - Change Parameters sub-menu
        4 - Set Terminal Efficiency
        5 - Display Calibration Table
        6 - Start Diode Service
        x - Exit Service

Select an item ->
```

DA	*Digital to Analog Converters*
Shutter/C3	*Shutter and Safety Cell 3*
Memory	*CPU RAM*
CPU	*CPU PCB*
Timer	*Interface PCB Secondary Clock*
EPROM	*EPROM Check Sums*
Analog	*Analog PCB*
Power	*Calibration Check*

5 Choose “Calibrate The System” from the options menu by pressing [2]. The following screen appears on the display:

```
                    Acquiring Eepot value

Get Eepot 0 value at 31

                    SYSTEM CALIBRATION

Calibrate Photo Monitor 1

Power Output will be set at 1000 mW

        Step 1:..Zero the Power Meter
        Step 2:..Position the Power Meter at the output port
        Step 3:..Depress the footswitch
        Step 4:..On the terminal, press <,d or >,u to adjust Pmon1
        .....to have a value between 1890 and 1910
        Step 5:..While observing Power meter,
        .....adjust Pmon1 Potentiometer on the laser head to obtain a value
        .....of 1000 mW on the power meter
        .....Press Space-Bar to re-read the values
        .....Release Footswitch and Press x when done

        NOTE: If laser cannot produce 1000mW, perform Step 6 below,
        otherwise continue.

        Step 6:.While observing Power meter, press <,d or >,u
        .....to obtain a value of 500mW on the power meter.
        .....Adjust Pmon1 Potentiometer on the laser head
        .....to obtain a value between 940 and 960.
        .....Press Space-Bar to re-read the values
        .....Release Footswitch and Press x when done

Press <Enter> key to continue ->

        Dio_Cur:3904  Feedback:4036  Pmon1:2852  Pmon2:4765 x
```

Read the five steps on the display then press <Enter> to display the parameters shown above, then perform the steps. Pressing the [U] and [D] keys changes the Dio_Cur by 10 while pressing the [<] and [>] keys changes the Dio_Cur by 1.

Figure 4-15 shows the location of PMON1 and PMON2. Rotating PMON1 potentiometer (on the Laser Head PCB) clockwise increases the value and rotating counter-clockwise decreases the value. Press the spacebar after every adjustment to update the readings.

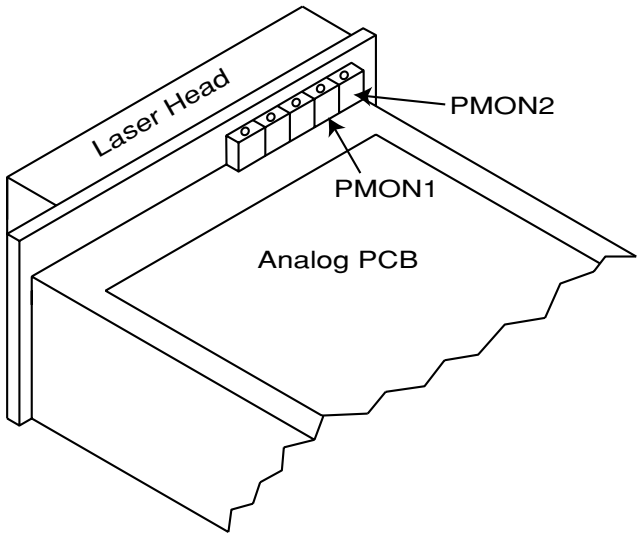


Figure 4-15
Location of Potentiometers PMON1 & 2

6 After pressing [X], the following screen appears for the calibration of Photo Monitor 2.

```
Calibrate Photo Monitor 2

Power Output will be set at 200 mW
        Step 1:..Zero the Power Meter
        Step 2:..Position the Power Meter at the output port
        Step 3:..Depress the footswitch
        Step 4:..On the terminal, press <,d or >,u to adjust Pmon1
        .........to have a value between 370 and 390
        Step 5:..While observing Power meter between 170 mW and 230 mW
         ........adjust Pmon2 Potentiometer so that
         ........Pmon2 value is close to Pmon1 value
         ........Press Space-Bar to re-read the values
         ........Release Footswitch and Press x when done

Press <Enter> key to continue ->

        Dio_Cur:2040  Feedback:2576  Pmon1:0380  Pmon2:0379 x
```

Small rotations of PMON2 result in large changes in the displayed reading. Press the spacebar after every adjustment to update the readings.

7 After pressing [X], the following screen appears as the system calculates the photomonitor 1, photomonitor 2, and simmer values.

```
Getting Photo Monitor 1 Threshold...
                The threshold value is 3 mV (0)        Point at which PMON1 detects light.
Getting Photo Monitor 2 Threshold...
                The threshold value is 3 mV (0)        Point at which PMON2 detects light.
Getting Simmer value
                Simmer value is 915 mV (Pmon=4 mV)     Current level when light is detected minus 25%.
Setting Power Offset

        Please wait...

Power Output will be set at 30 mW

        Step 1:..Zero the Power Meter
        Step 2:..Position the Power Meter at the output port
        Step 3:..Depress the footswitch
        Step 4:..While observing Power meter, adjust the
         ........power by pressing <,d or >,u keys until
         ........the Power meter reads 30 mW
        Step 5:..Release Footswitch and Press x when done

Press <Enter> key to continue ->

Adjust Power Output ->                                 Amount power curve must be shifted to get true 30 mW.

Power Offset is 10

        Data Acquisition in progress - Please Wait...
```

After pressing [X], the Power Offset value is shown, Data Acquisition begins and when complete, the following screen appears.

```
                Terminal Calibration Menu

*****************************************************************************
*WARNING!                                                                   *
* IT IS OPERATOR'S RESPONSIBILITY TO PROPERLY SELECT THE TERMINAL USED.     *
* ALCON SHALL NOT BE HELD LIABLE FOR PROBLEMS CAUSED BY A MIS-SELECTION     *
* OF THE TERMINAL USED. FAILURE TO COMPLY MAY CAUSE PATIENT AND             *
* OPERATORS TO BE EXPOSED TO HAZARDOUS LASER RADIATION                      *
*****************************************************************************

        1 - Slit Lamp Terminal Calibration
        2 - LIO Terminal Calibration
        x - Return to Main Menu
        ___________________________________

Select an item ->
```

Note: If the customer does not have a Slit Lamp, the calibration for it must still be performed. In this case enter the maximum value allowed for the power meter reading. To perform the slit lamp calibration, a doctor's filter must be installed.

8 Select the Slit Lamp Terminal Calibration option from the menu by pressing [1] and then press [Enter]. The following display appears with instructions on performing the calibration.

```
                Slit Lamp Terminal Calibration

Step 1: Verify that the power meter is properly position at
   the Slit Lamp output. Use the 1 Watt range

 WARNING
 WHEN THE FOOTSWITCH IS DEPRESSED, THE SYSTEM WILL EMIT
 1 WATT AT THE OUTPUT. OBSERVE ALL SAFETY REQUIREMENTS

Step 2: Depress the footswitch and
   read the actual output power on the power meter
Step 3: The power meter reading must be between 550mW and 900mW.
   If the reading is not within this range, stop the calibration
   procedure, do not use the system and call Alcon Technical Services.

Press <Enter> key to continue ->

                Enter Your Reading -> 750

Step 4: You entered 750; is this correct ?
   Press 'Y' to accept the reading;
   press 'N' to re-enter the reading
                Accept the reading? -> y

Your calibration factor is 75 percent
```

If the value obtained is not within specification, return to the Fiber Alignment procedure in this section of the manual.

Note: Values used in the screen shown above are for illustrative purposes only.

9 Perform the LIO Terminal calibration next by selecting option 2 and following the directions on the display.

NOTE: If the customer does not have an LIO, the procedure must still be performed. In this case enter the maximum value allowed for the power meter reading.

If the value obtained is not within specification, return to the optical alignment procedure in this section of the manual.

10 When complete press [X] to return to the main menu and press [X] again to exit the service menu.

ADJUSTMENTS

SETTING THE TERMINAL EFFICIENCIES

1 Connect a computer terminal to the service port on the EyeLite®. Turn on the computer and start the communications software. Refer to the Special Tools section for communications protocol.

2 Place the power meter head at the output of the delivery system.

3 Turn on the main power switch and then turn the keyswitch of the EyeLite® to the ON position. Turn on the power of the delivery system.

4 On the computer terminal, enter the service mode by typing the password ABBMST. Read the warning message and press [Enter] to continue. The following screen appears on the display:

```
                    OPHTHALAS® 532EyeLite®

                    Calibration Procedure

*********************************************************************
*          WARNING                                                  *
* It is operator's responsibility to comply with the safety regulations and *
* all personnel in the room must wear goggles with an OD 4 or above at 532nm. *
* By typing the password in the next step, you are agreeing that you have *
* read, understand, and will comply with the procedure              *
*                                                                   *
* It is operator's responsibility to strictly follow the calibration *
* procedure. Non-compliance with this procedure could result in a   *
* miscalibration of the system and patient injury. Each time a calibration *
* is done, the operator must verify that the system is in compliance with *
* the Energy Matrix provided in the Calibration Verification procedure. *
* If the system still does not comply with the Energy Matrix, the operator *
* must call Alcon Technical Services for assistance and discontinue using *
* the system.                                                       *
*********************************************************************

        Software Version: 1.0          Build Date:Wed Aug 07 16:33:47 1996

        Hardware Compatible: 0x01

DA:ok, Shutter/C3:ok, MEMORY:ok, CPU:ok, TIMER:ok, EPROM:ok, ANALOG:ok, POWER:ok

CRC:32EF
_____________________________________________________

        Ophthalas® 532 EyeLite® Main Menu

        1 - Display System Parameters
        2 - Calibrate The System
        3 - Change Parameters sub-menu
        4 - Set Terminal Efficiency
        5 - Display Calibration Table
        6 - Start Diode Service
        x - Exit Service

_____________________________________________________

Select an item ->
```

5 Press [4] to select "Set Terminal Efficiency", then press <Enter> to continue when prompted.

```
                    Terminal Calibration Menu

*********************************************************************
*WARNING!                                                           *
* IT IS OPERATOR'S RESPONSIBILITY TO PROPERLY SELECT THE TERMINAL USED. *
* ALCON SHALL NOT BE HELD LIABLE FOR PROBLEMS CAUSED BY A MIS-SELECTION *
* OF THE TERMINAL USED. FAILURE TO COMPLY MAY CAUSE PATIENT AND     *
* OPERATORS TO BE EXPOSED TO HAZARDOUS LASER RADIATION              *
*********************************************************************

        1 - Slit Lamp Terminal Calibration
        2 - LIO Terminal Calibration
        x - Return to Main Menu
_____________________________________________________

Select an item ->
```

6 • If setting the efficiency of a Slit Lamp, press [1].
• If setting the efficiency of a LIO, press [2].

7 Press the footswitch and note the output power on the power meter. Release the footswitch.

8 On the computer terminal, enter the value noted in the step above and press <Enter>.

If an error message is displayed stating that the value is out of range, or a minimum value cannot be obtained, try one of the following options:
• check the chimney alignment.
• check the condition of the fiber.
• check the optics of the delivery system.
• call Alcon Technical Support.

9 Press [X] to exit the terminal efficiency sub routine. Press [X] to exit the service menu. Disconnect the computer terminal from the service port of the EyeLite®, and restart the EyeLite®.

RESETTING THE CPU PCB

The CPU PCB must be reset after it has been replaced or the battery-backed RAM has failed.

1 Remove the top cover as described in Section 3.

2 Connect a VGA monitor with a 15 pin HD connector to the monitor port of the CPU.

3 Connect a PS/2 style keyboard to the keyboard port.

4 Turn on the monitor.

5 Press and hold down function key [F2] while turning on the EyeLite®.

6 Select the Boot Sequence by using the arrow key and press [Enter]. Press the spacebar to toggle the choices to A: then C:. Press [Enter].

7 Use the arrow key and space bar to disable the Setup Prompt, Post Error, Floppy Check, and Summary Screen.

8 Press the [ESC] key and use the arrow key to select Embedded Features. Insure that the first and second lines are disabled. Select them and press the space bar to disable them if necessary.

9 Use the arrow key to select ROM/RAM DISC 0. Press the space bar to toggle to PCMCIA and press [ESC].

10 Press [ESC] to exit then press [Enter] at “Save changes and exit” prompt. Then press [Enter] to confirm.

11 Turn off the EyeLite®, disconnect the keyboard and monitor, and install the Top Cover.

SETTING THE KEYPAD ILLUMINATION

1 Remove the Front Panel per Section Three and position it to permit access to the Front Panel PCBs.

2 Turn the laser ON.

3 Turn the potentiometer near L12 on the Keyboard PCB to its minimum value (fully counter-clockwise). See Figure 4-16 for potentiometer location.

4 Connect a DVM to TP2 and TP9 on the Front Panel PCB.

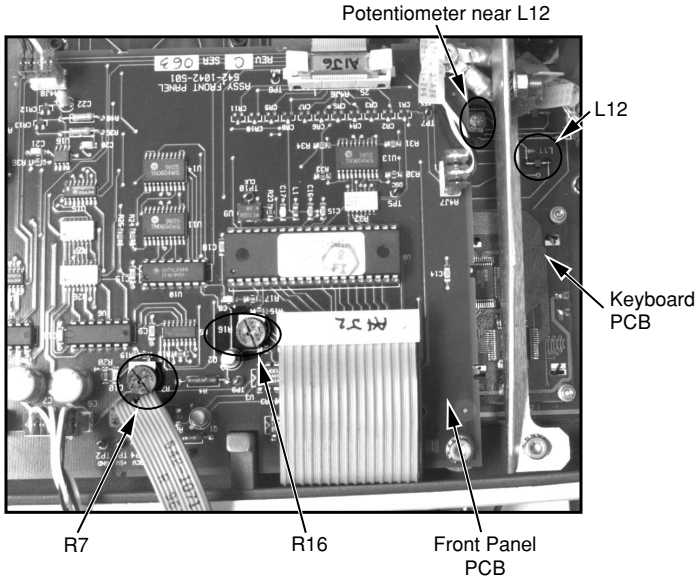


Figure 4-16
Location of Potentiometers for Keypad Illumination Adjustment

5 Adjust potentiometer R7 on the Front Panel PCB to obtain a reading of 17mV ±1mV.

6 Adjust R16 on the Front Panel PCB to its minimum value (fully counter-clockwise).

7 Replace the Front Panel per Section 3.

CHANGING THE SYSTEM PARAMETERS

The system parameters must be changed if the Interface PCB and/or the Laser Head are replaced. To change the system parameters, connect a service terminal to the EyeLite® and follow the instructions below. Refer to the Special Tools section for communications protocol.

1 Start the Service Subroutine, enter the password (ABBMST), and select option 3- "Change Parameters" sub-menu.

```
--------------------------------------------------------------------

        Change System Parameters Menu

        1 - Set Laser Engine Serial Number

        2 - Change Display Language

        3 - Reset Service Requirement

        4 - Enter Hardware Revision Number

        5 - Set Ready Mode Timeout

        x - Return to Main Menu

--------------------------------------------------------------------

    Select an item ->
```

2 Select option 1 - "Set Laser Engine Serial Number" and press [Enter] to input the Laser Head serial number. **NOTE: Be sure to input the serial number from the label on the side of the chassis, not the serial number from the label on the laser head (see Figure 3-9).**

3 Select option 2 - "Change Display Language" and press [Enter] to change the system language. Enter "0" for English, "1" for French, "2" for German, "3" for Spanish, or "4 for Portuguese.

4 Select option 3 - "Reset Service Requirement" and press [Enter] to reset the Service Required Flag.

5 Select option 4 - "Enter Hardware Revision Number" and press [Enter] to update the hardware revision.

6 Select option 5 - "Set Ready Mode Timeout" and press [Enter] to set the standby timeout value where 0 = 2 minutes and 1 = 10 minutes.

7 Press "X" to exit then restart the EyeLite®.

TROUBLESHOOTING

The following tables and troubleshooting trees are provided as an aid to troubleshooting the system. The flow of the troubleshooting trees is left to right and top to bottom. For example: the system displays a "Footswitch Fault" which is described in Table 4-2, item 1. This table refers to Figure 4-27 for corrective action. Starting at the box on the left side of the tree, follow the branch down until the problem is corrected or it is determined that this branch does not contain the appropriate corrective action. If it does not, proceed to the next branch on the right and continue in this manner until the problem is corrected.

Table 4-2
Error Messages Displayed on the Front Panel

ITEM #	ERROR MESSAGE	PROBABLE CAUSE	CORRECTIVE ACTION
1	Footswitch Fault	Footswitch not detected.	Figure 4-27
2	Shutter Fault	a) Shutter open when it should be closed. b) Shutter closed when it should be open.	Figure 4-35
3	C-3 Detected*	a) Laser light detected when it should not be detected. b) No laser light detected when it should be detected.	Figure 4-30
4	Aiming Beam	Aiming beam monitor signal not detected.	Figure 4-33
5	Fiber	Fiber detectors not sensed by system.	Figure 4-31
6	Laser Fault XX	See Laser Fault Table.	--
7	Software Fault XX	See Software Fault Table.	--
8	Hardware Fault XX	See Hardware Fault Table.	--
9	Laser Output	a) The sensed power is different than the requested power by ±50%. b)The difference between PMON1 and PMON2 is greater that 25% of the smallest value. Must occur twice in succession.	a) Perform Laser Engine Inspection procedure. b) Figure 4-25
10	Potentiometer	a) Power pot turned too quickly. b) Rapid increase/decrease in requested power.	Figure 4-34
11	Service Requested	a) "Laser Output" occured twice in succession when requested power was >200mW. b) Incompatibility between the hardware and the software.	Figure 4-28
12	Calibration Required	a) No calibration data present. b) The Interface PCB or the Laser head was replaced.	Figure 4-29
13	Check Filter/Bridge	Doctors Filter or 3000LE bridge interconnect not detected.	Figure 4-32
14	Power not in range	a) sensed power is not ±20% of requested power before shutter is opened. b) Power supply failed after startup.	a) Perform Laser Engine Inspection procedure. b) Figures 4-18, 26
15	Off Condition	Sensed power is not ±20% of requested power while laser is being fire.	Perform Laser Engine Inspection procedure.

* C-3 Detected and Shutter error messages are interchangeable. The error message displayed depends on which cycle the program was in when the error was detected.

Table 4-3
Laser Faults*

FAULT #	FAULT	PROBABLE CAUSE	CORRECTIVE ACTION
1	Over Current	Current sensed by S2 is greater than the set current.	Figure 4-17
2	Over Voltage	Voltage across diode is too high.	Figure 4-18
3	Watchdog	On & Off times are out of specification.	Figure 4-19
4	Temperature	a) Head Temperature is either too low or too high. b) Doubler Temperature is too high. c) Analog PCB heat sink temperature is too high.	Figures 4-20, 24, 36
5	Off	Diode current is present (ON) when it should be off.	Figure 4-21
6	Head	Problem with Head PCB or Head PCB ribbon cable.	Figure 4-22
7	Remote	Interlock jumper not detected.	Figure 4-23

* Laser faults are sent to the CPU from the Analog PCB via the Interface PCB.

Table 4-4
Software Faults*

FAULT #	FAULT	PROBABLE CAUSE
1	Error Process	One of the processes is not responding.
2	Send Process	Send data process is not responding.
3	Power Process	Power process is not responding.
4	Pulse Process	Pulse process is not responding.
5	MAP Process	Calibration MAP process is not responding.
6	Monitor Process	Monitor process is not responding.
7	Pedal Process	Footswitch process is not responding.
8	Receive Process	Receive data process is not responding.
9	Timer Process	Timer process is not responding.
10	Data Duplication	Data duplication failed at startup.
11	MSG Que	MSG Queing failed.
12	Semaphore	Semaphore setting failed.
13	Priority	Priority setting failed.
14	Fiber Coefficient	Values of fiber coefficients are out of range.

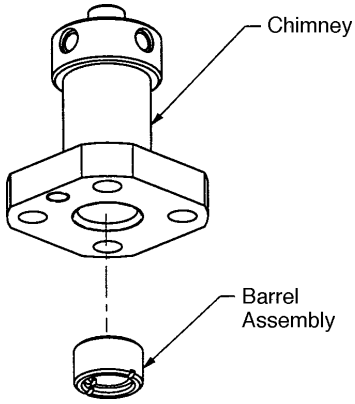
* Software faults are only related to the program. Most of these faults are corrected by restarting the EyeLite® or by installing new software.

Table 4-5
Hardware Errors*

FAULT #	FAULT	PROBABLE CAUSE	CORRECTIVE ACTION
1	CRC	Cyclical Redundancy Check failed in program.	Figure 4-37
2	Serial	No serial communication between CPU and Front Panel PCB. Corrupt data packet.	Figure 4-38
3	PMON	Current PMON reading exceeds the average of the last 8 readings by more than 50%.	Figure 4-39
4	EPROM	Data in EPROM not correct. a) CRC not correct. (Interface PCB) b) Calibration data not correct. (Laser Head PCB) c) Value in Eprom not in range.	Figure 4-40
5	Start Up	a) Reset of Analog PCB failed. b) Power sweep value(s) are out of range. c) Power sweep did not occur.	See Table 4-6 (Hardware Error 5)
6	DA	Digital to Analog converter on the Interface PCB failed the Write/Read test.	Figure 4-42
7	Memory	Memory address locations failed the Write/Read test.	Figure 4-43
8	CPU	CPU Error.	Figure 4-44
9	Keyboard	Two or more buttons on the keypad are perceived by the system to be pressed.	Figure 4-45
10	Timer	Timer counter on the Interface PCB (EEDAT) not in sync (greater than 1.0ms) with the system clock.	Figure 4-42
11	Analog	a) Voltage on the electronics power supply is too low. b) Set fault condition of the Analog PCB is not detected correctly.	Figure 4-46

* Faults 4, 5, 6, 7, 8, 10, and 11 are only detected during startup. All other errors are continuously monitored by the system.

Table 4-6
General Troubleshooting

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
EyeLite¨ does not start and displays 0's in the power and exposure time displays.	CPU/Software did not boot. Defective CPU or PCMCIA card	Replace CPU and/or PCMCIA card.
Message display reverts back to "Confirm Slit Lamp?" after firing a shot.	Chimney is not correctly aligned to the fiber optic cable.	Perform Fiber Alignment (step 4 of the Optical Alignment procedure).
Fiber efficiency is greater than what the calibration routine allows.	Achromat lens in chimney is not adjusted correctly.	1) Remove chimney from optic block. 2) Rotate barrel nut 1/4 turn clockwise.  3) Replace chimney and test efficiency.
Fiber efficiency is lower than specification.	Bad fiber or Achromat lens in chimney is not adjusted correctly.	1) Check efficiency with a good fiber. If OK, then replace fiber. If not, continue to next step. 2) Perform Fiber Alignment (step 4 of the Optical Alignment procedure). If efficiency is still lower than specification, go to next step. 3) Remove chimney from optic block. 4) Rotate barrel nut 1/4 turn counterclockwise. 5) Replace chimney and test efficiency. 6) If condition persists, repeat from step 3 and turn barrel nut 1/2 turn clockwise.
Hardware Error 05	Additional warm-up time needed.	1) If laser starts normally after turning the unit off and back on two or three times, upgrade the software version to 1.10 or greater. 2) If the problem persists, see Figure 4-41.

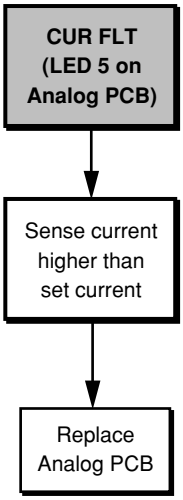


Figure 4-17
Laser Fault 1 Troubleshooting Tree

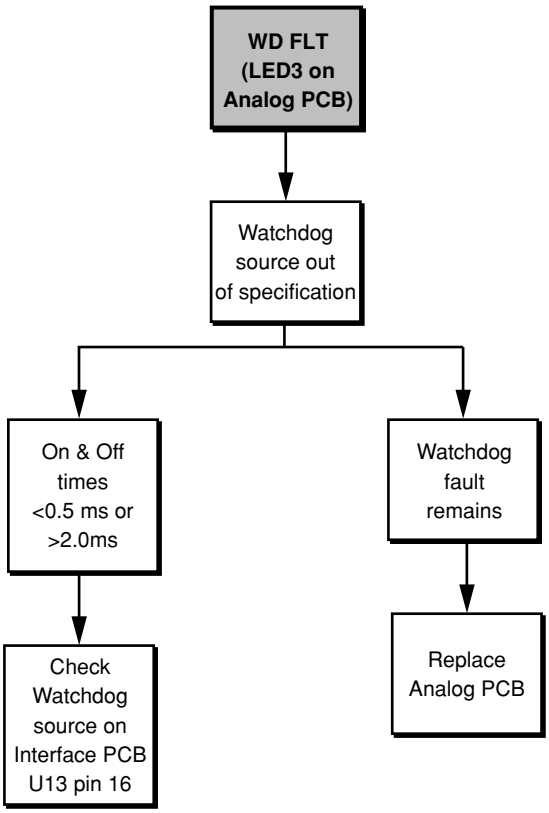


Figure 4-19
Laser Fault 3 Troubleshooting Tree

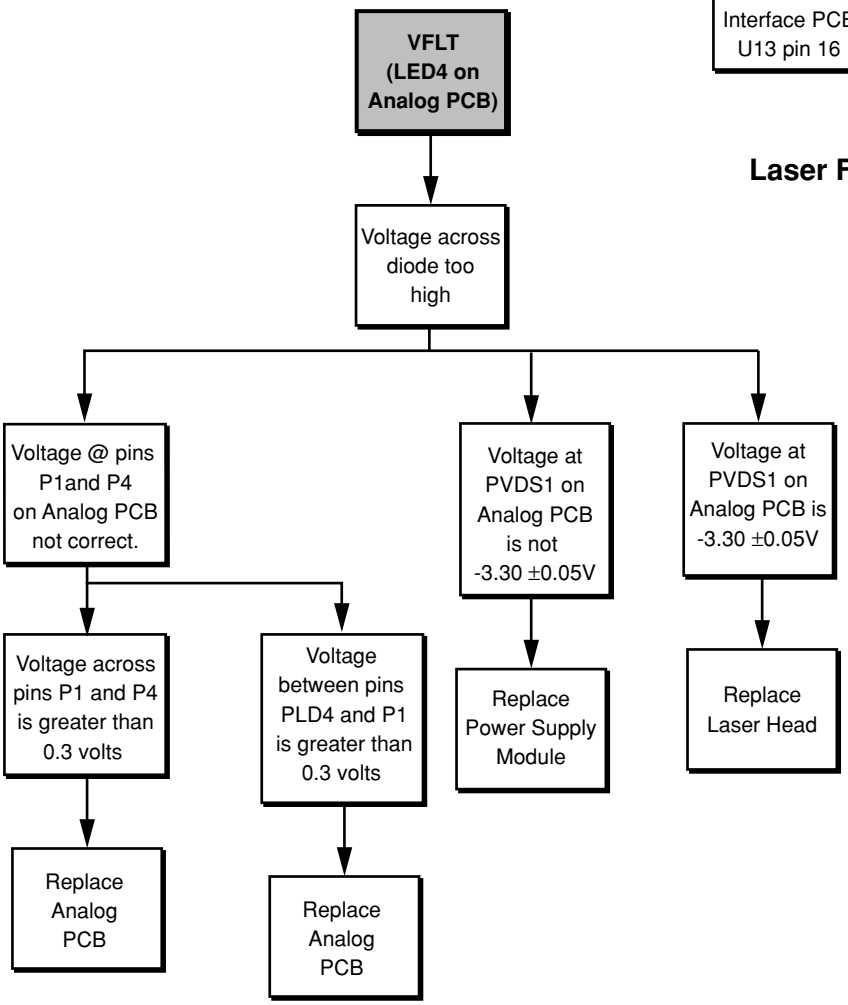


Figure 4-18
Laser Fault 2 Troubleshooting Tree

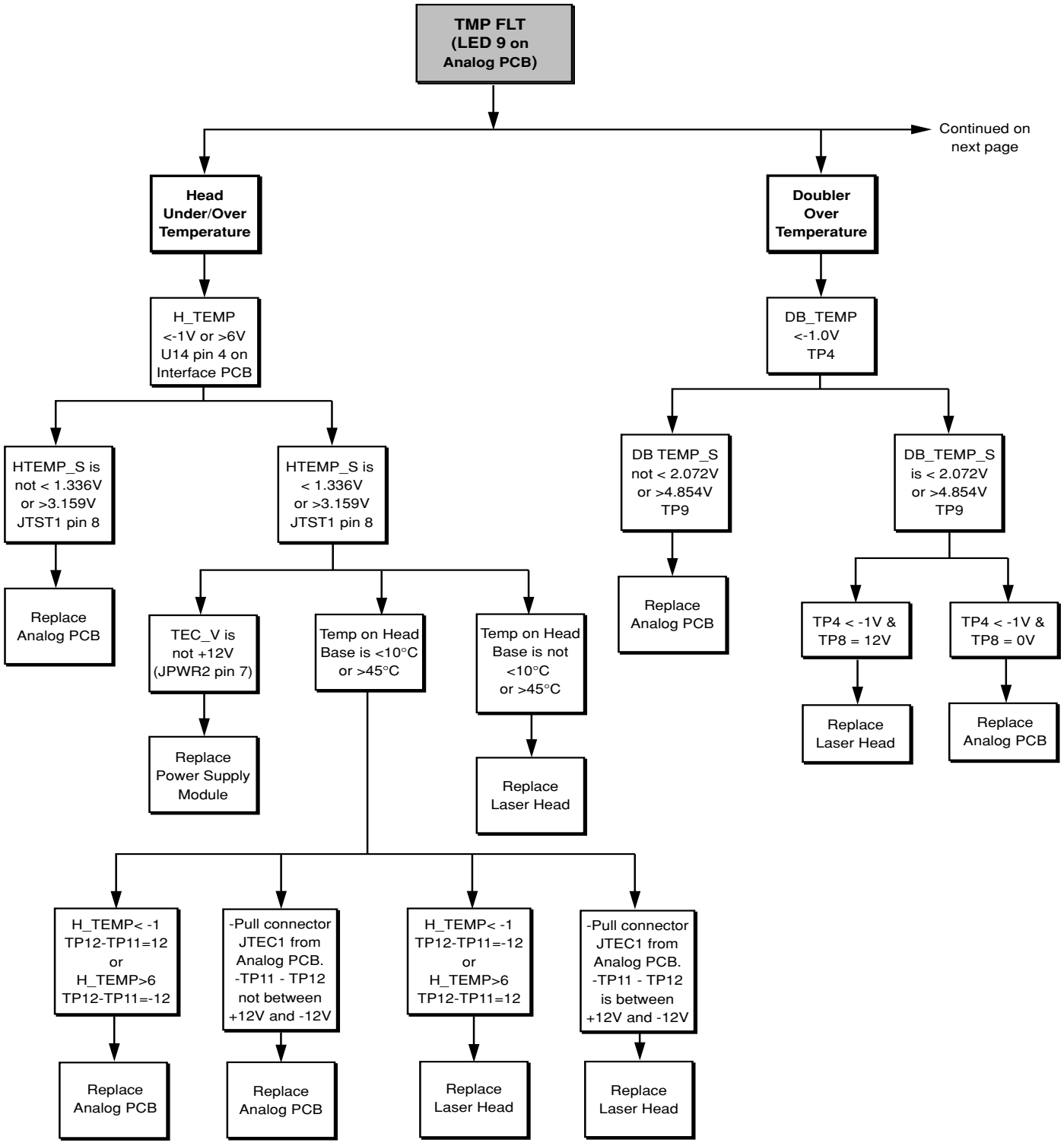


Figure 4-20
Laser Fault 4 Troubleshooting Tree

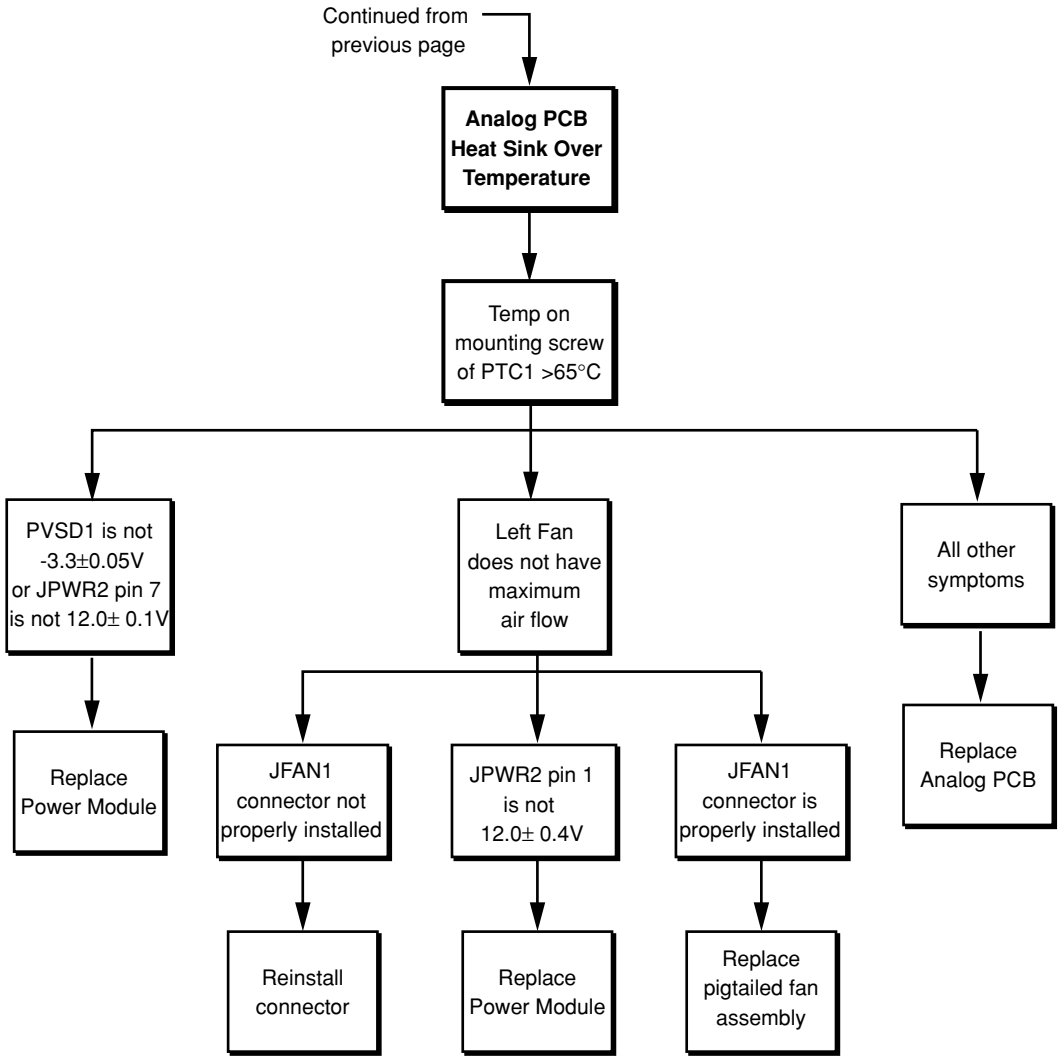


Figure 4-20 (continued)
Laser Fault 4 Troubleshooting Tree

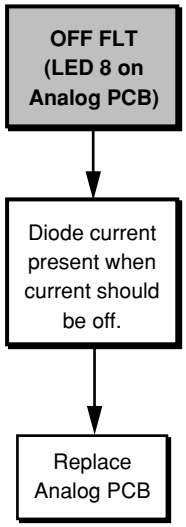


Figure 4-21
Laser Fault 5 Troubleshooting Tree

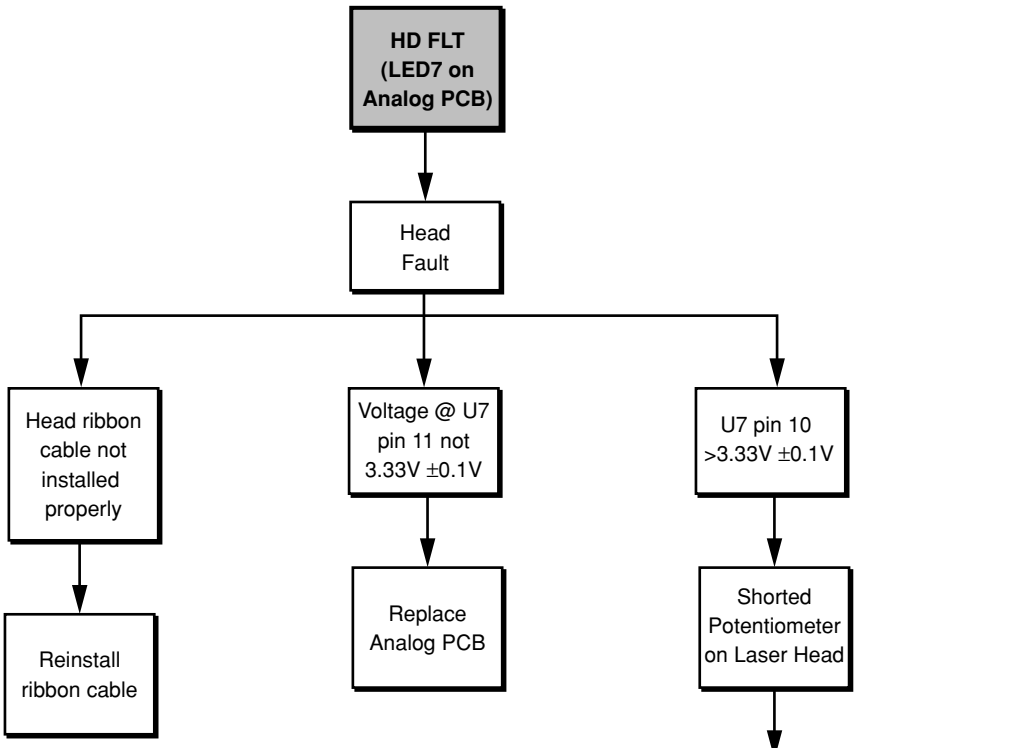


Figure 4-22
Laser Fault 6 Troubleshooting Tree

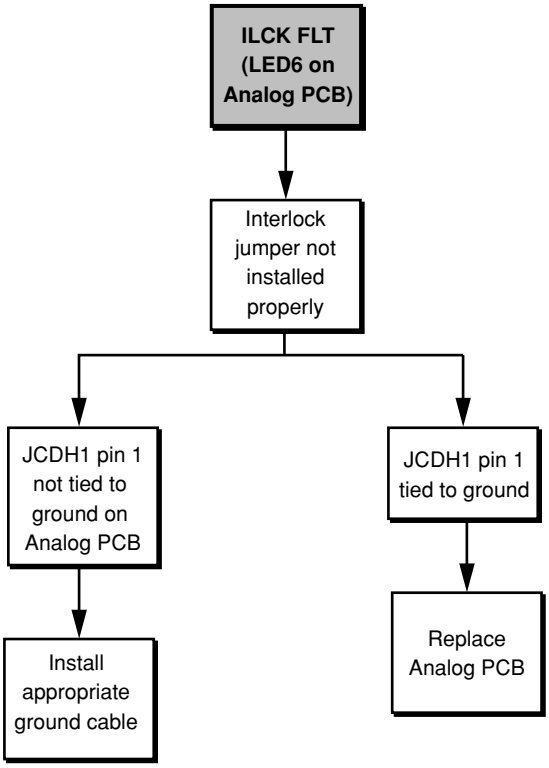


Figure 4-23
Laser Fault 7 Troubleshooting Tree

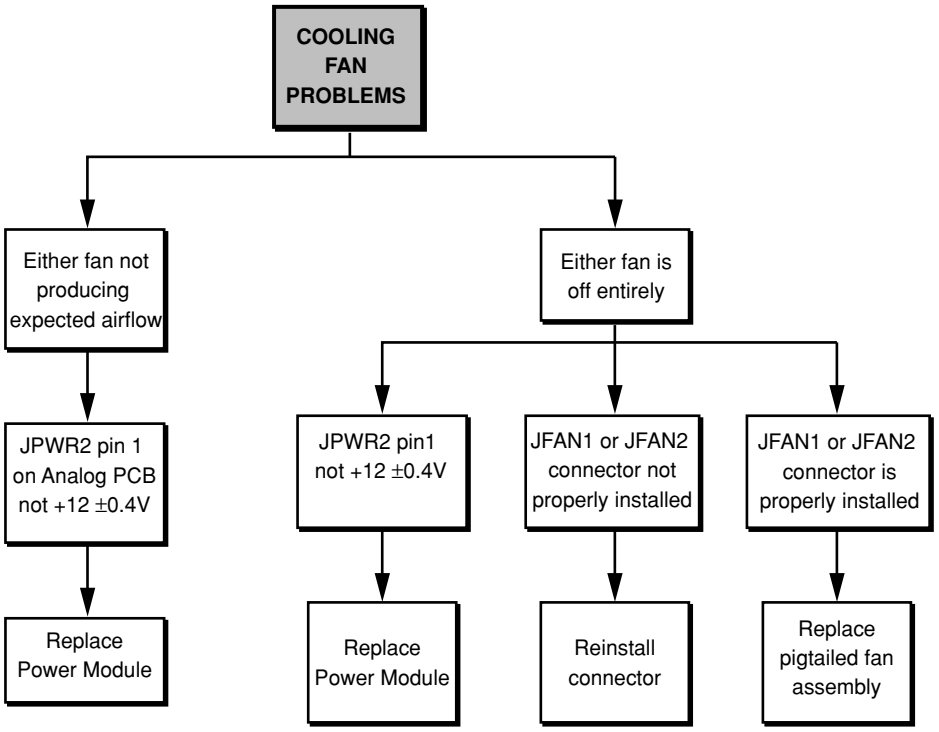


Figure 4-24
Cooling Fans Troubleshooting Tree

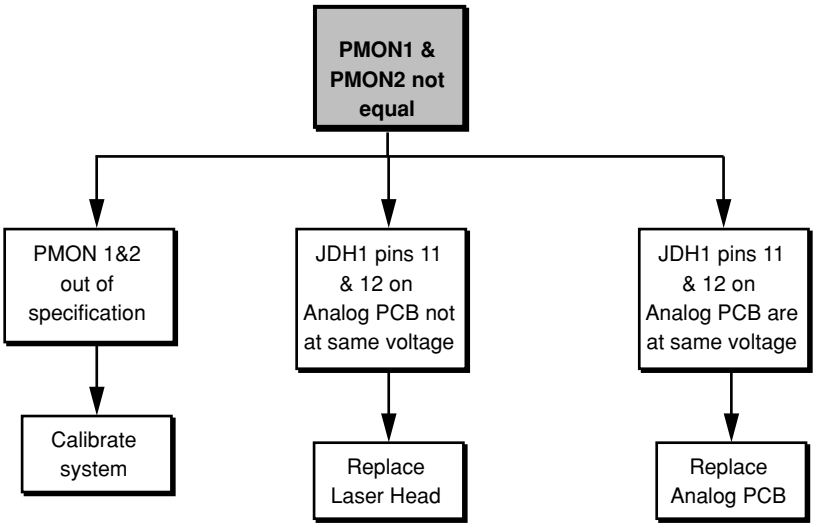


Figure 4-25
PMON1 & PMON2 Troubleshooting Tree

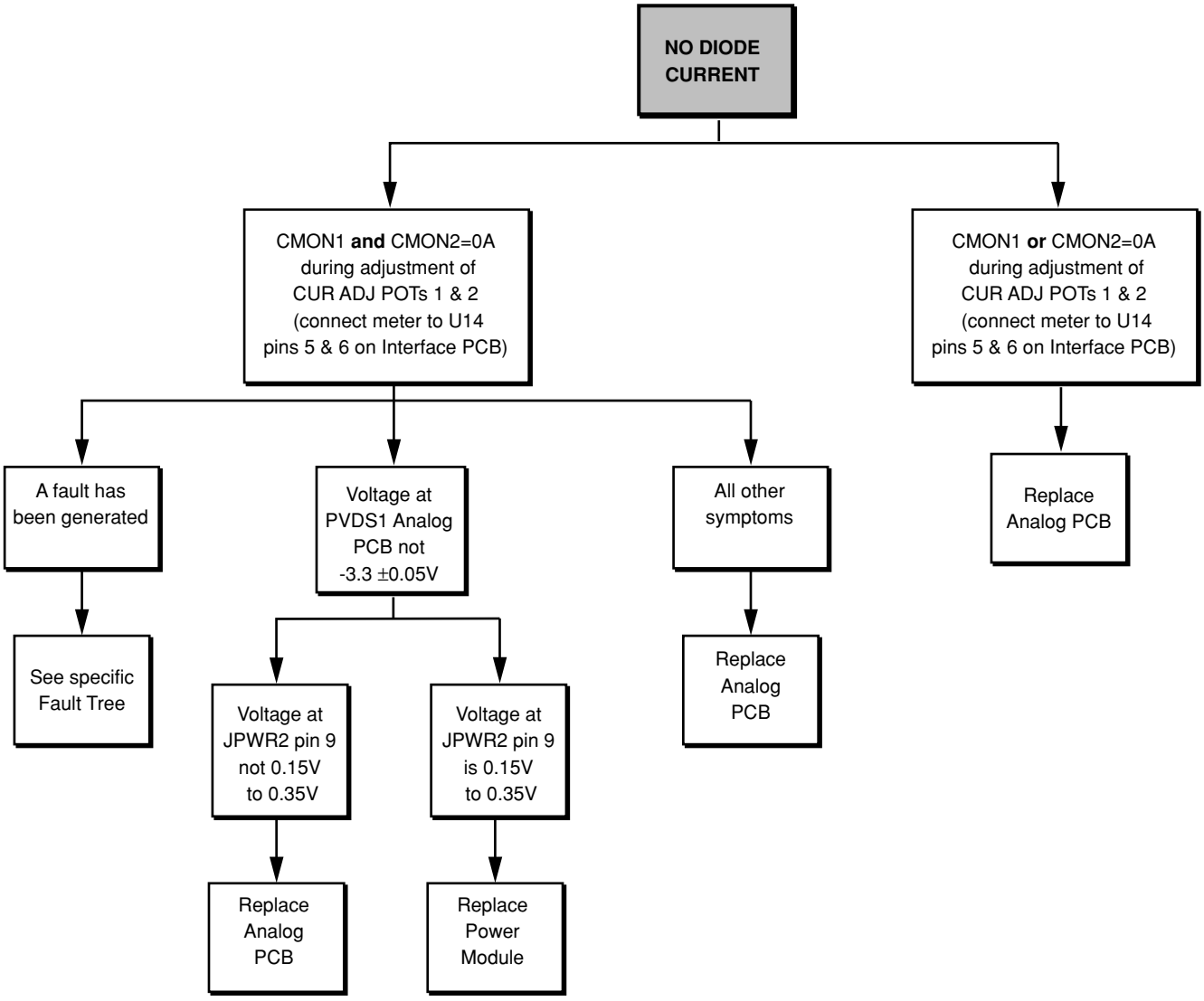


Figure 4-26
No Diode Current Troubleshooting Tree

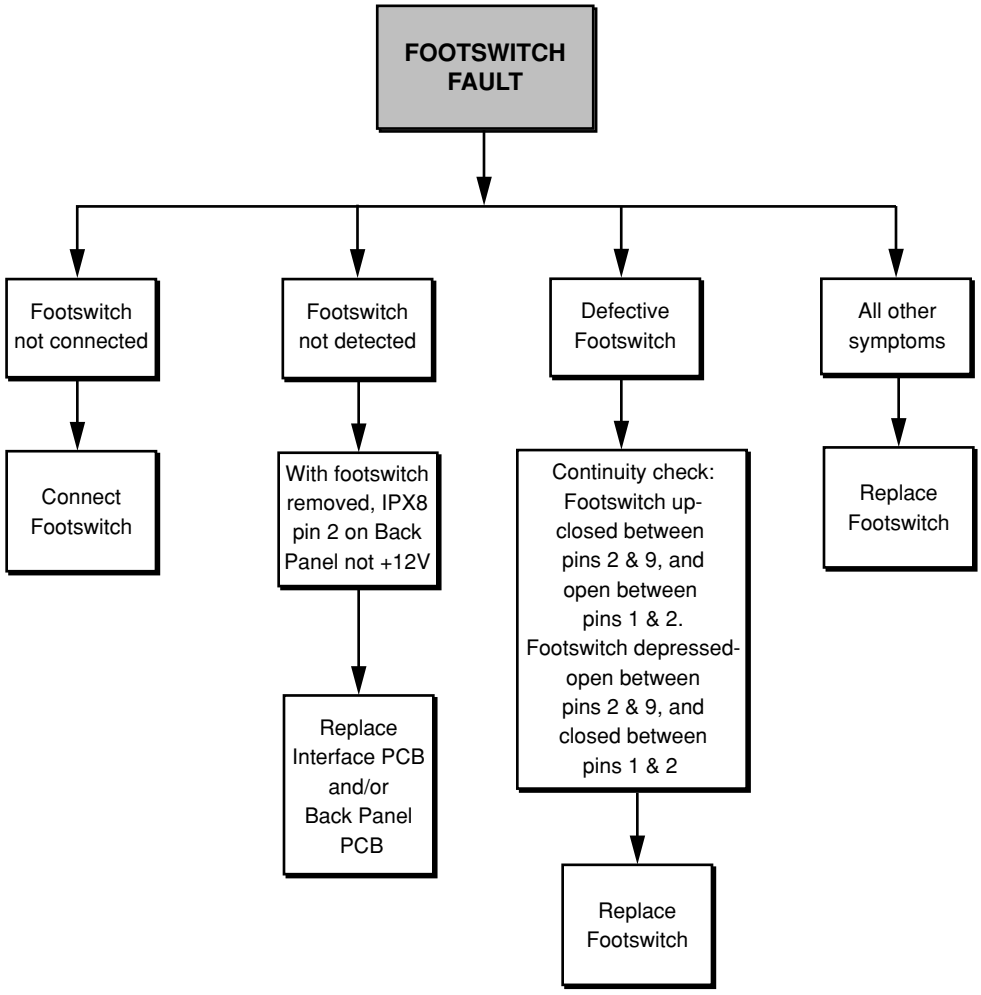


Figure 4-27
Footswitch Troubleshooting Tree

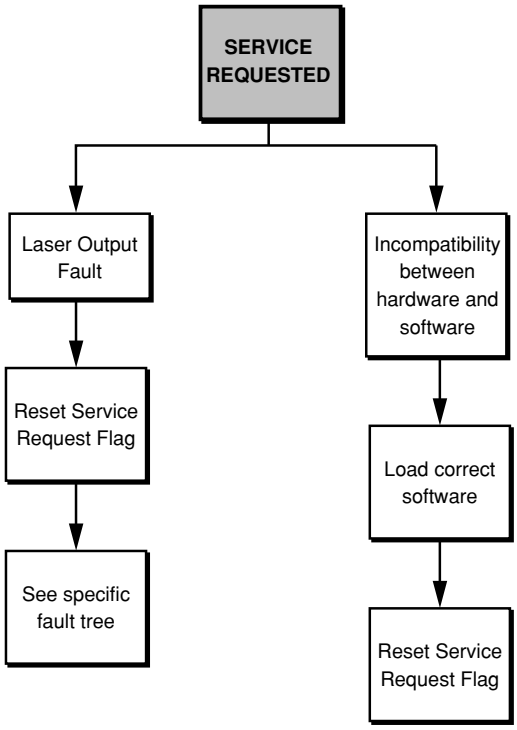


Figure 4-28
Service Requested Troubleshooting Tree

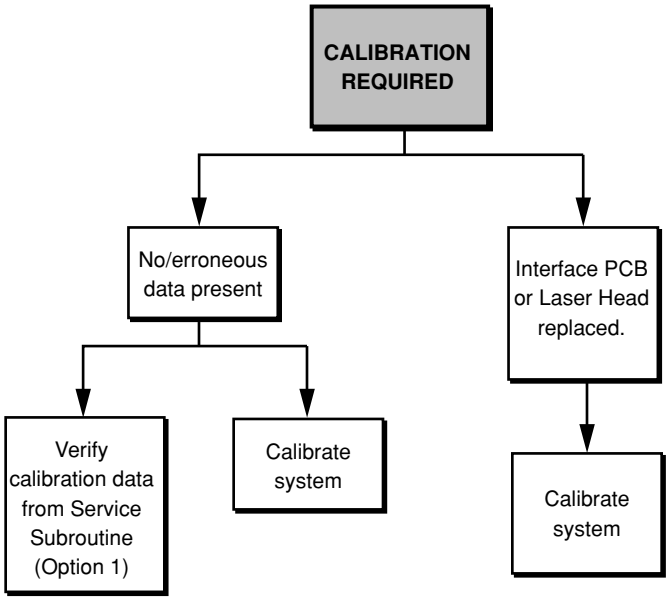


Figure 4-29
Calibration Required Troubleshooting Tree

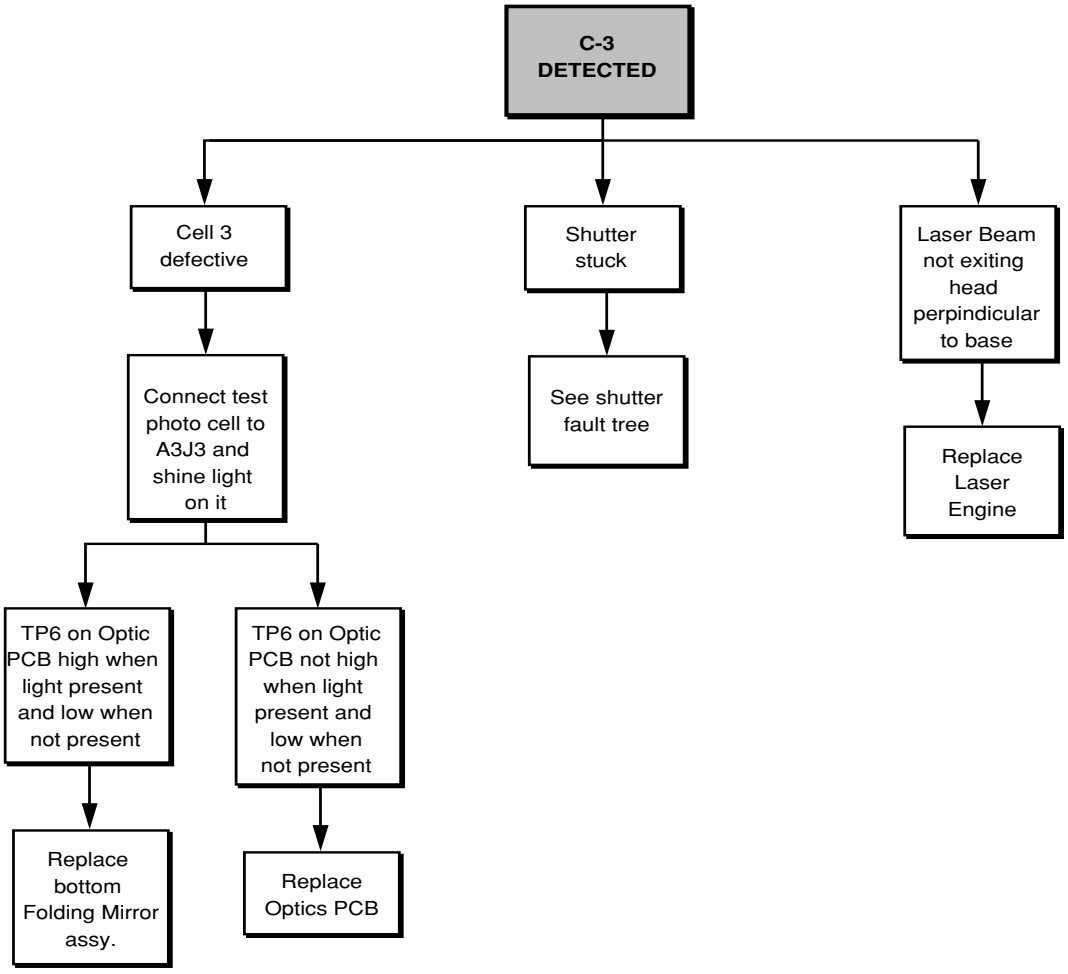


Figure 4-30
Cell 3 Detected Troubleshooting Tree

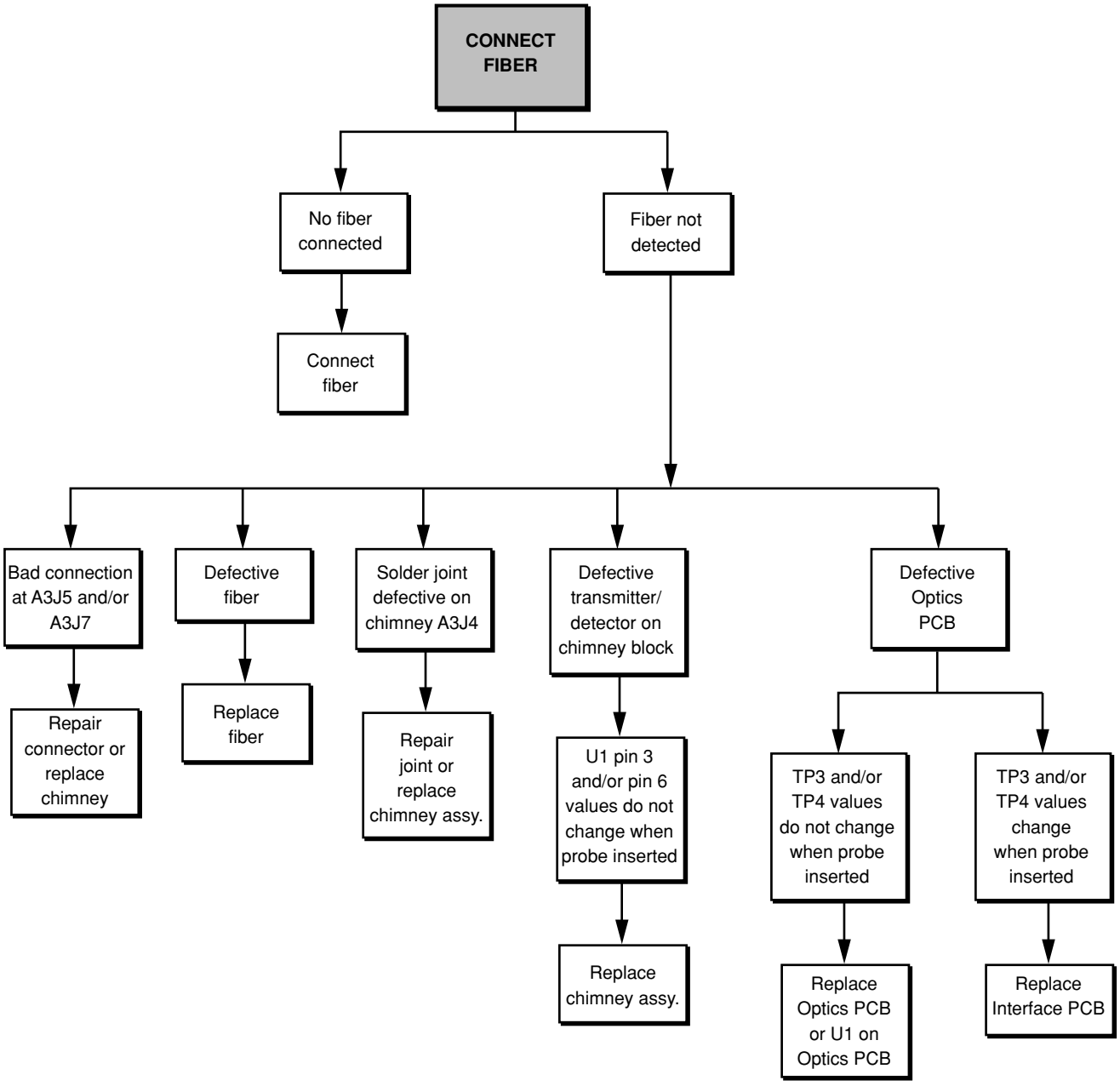


Figure 4-31
Connect Fiber Troubleshooting Tree

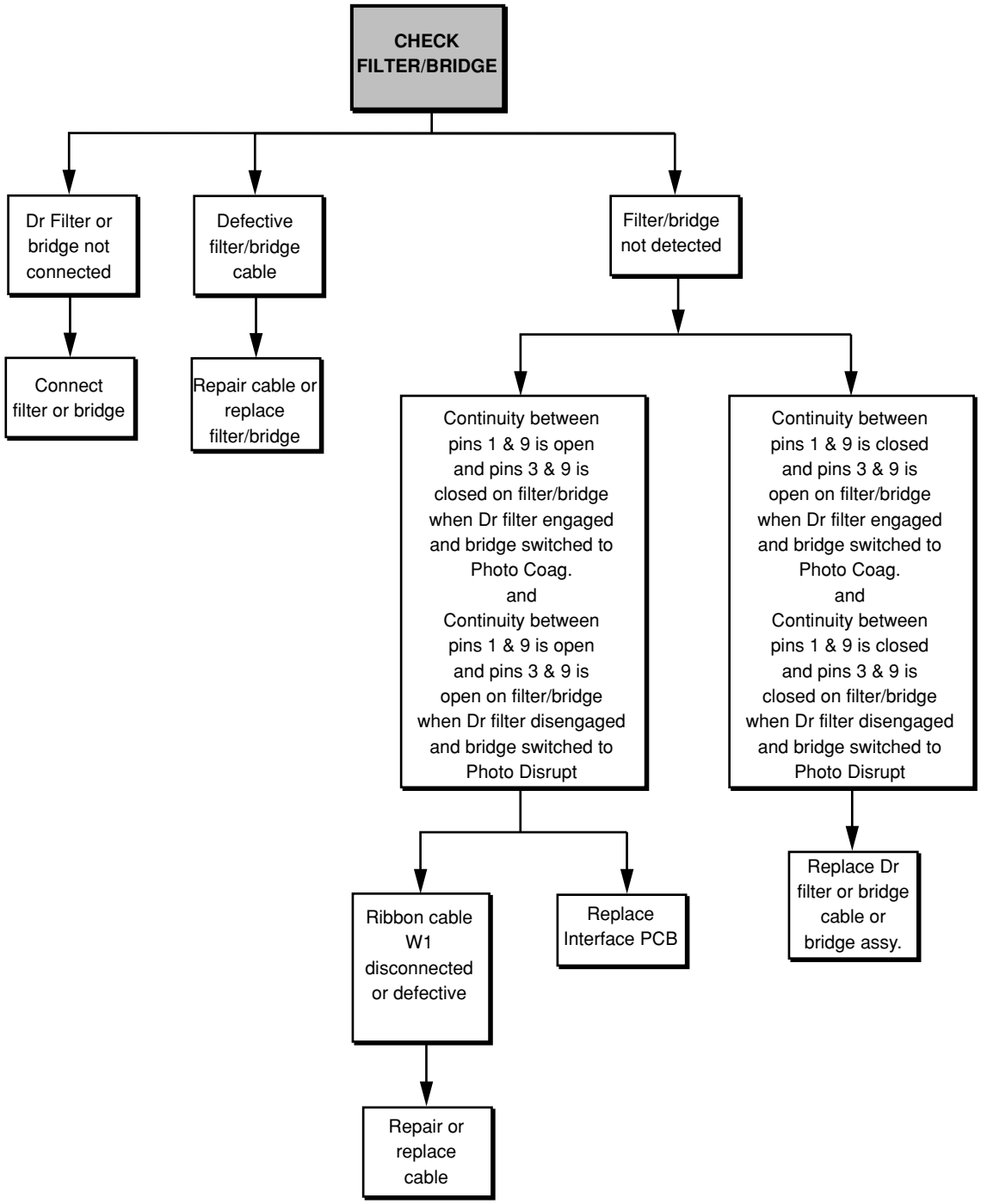


Figure 4-32
Check Filter/Bridge Troubleshooting Tree

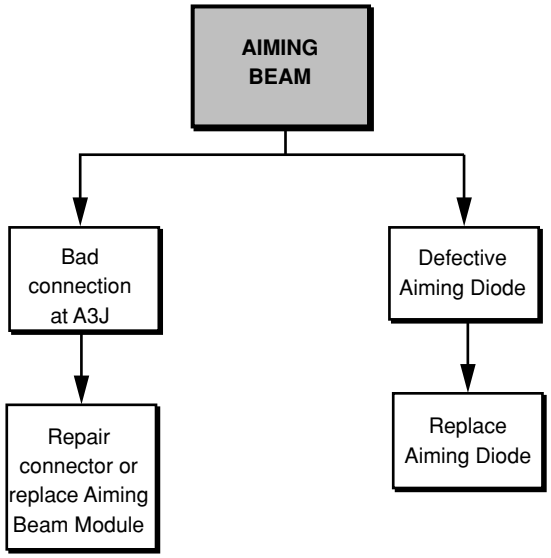


Figure 4-33
Aiming Beam Troubleshooting Tree

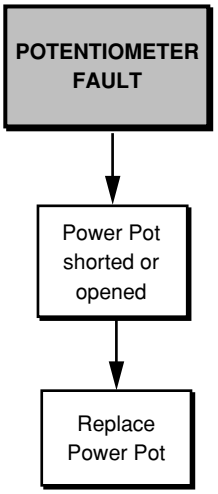


Figure 4-34
Potentiometer Fault Troubleshooting Tree

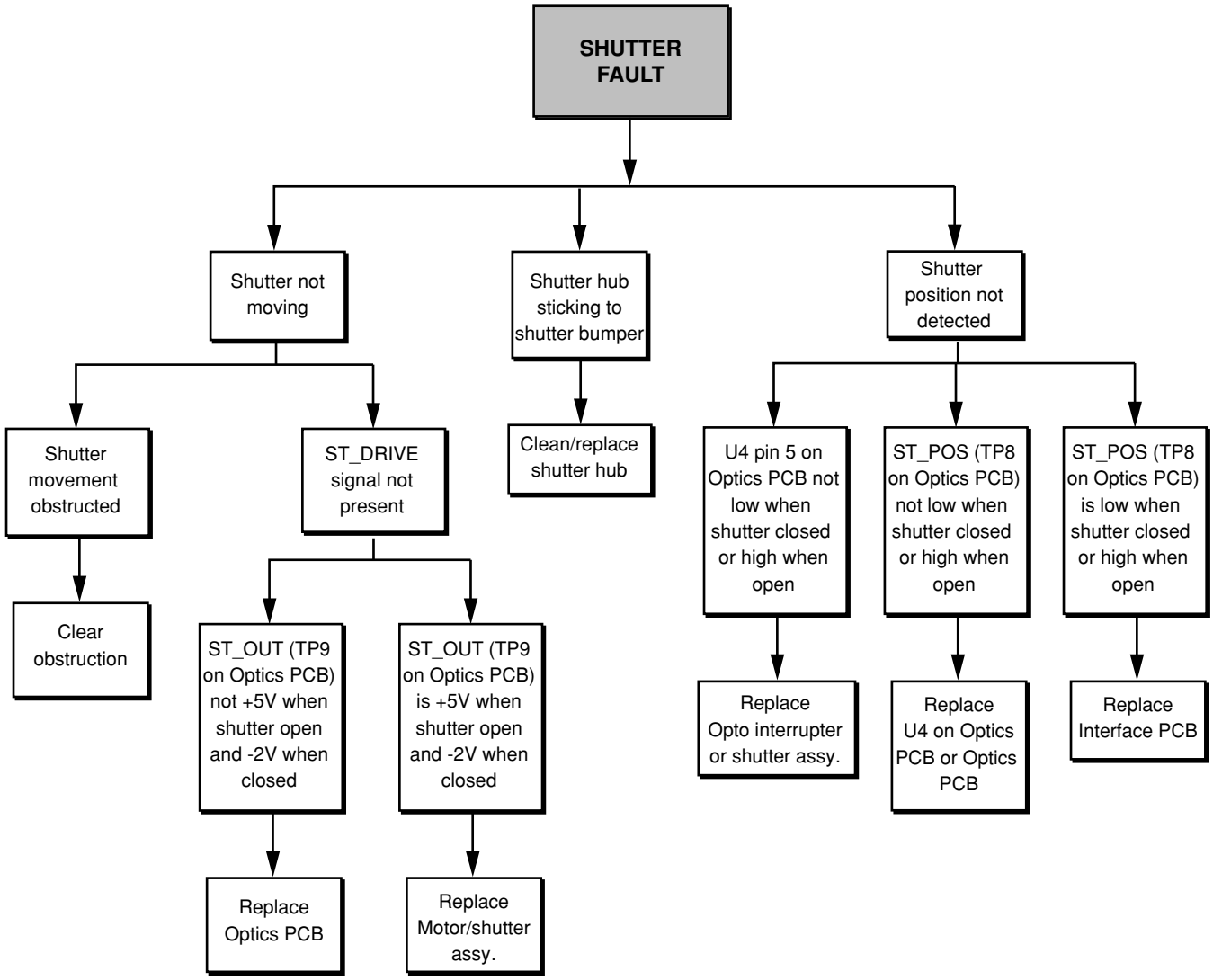


Figure 4-35
Shutter Fault Troubleshooting Tree

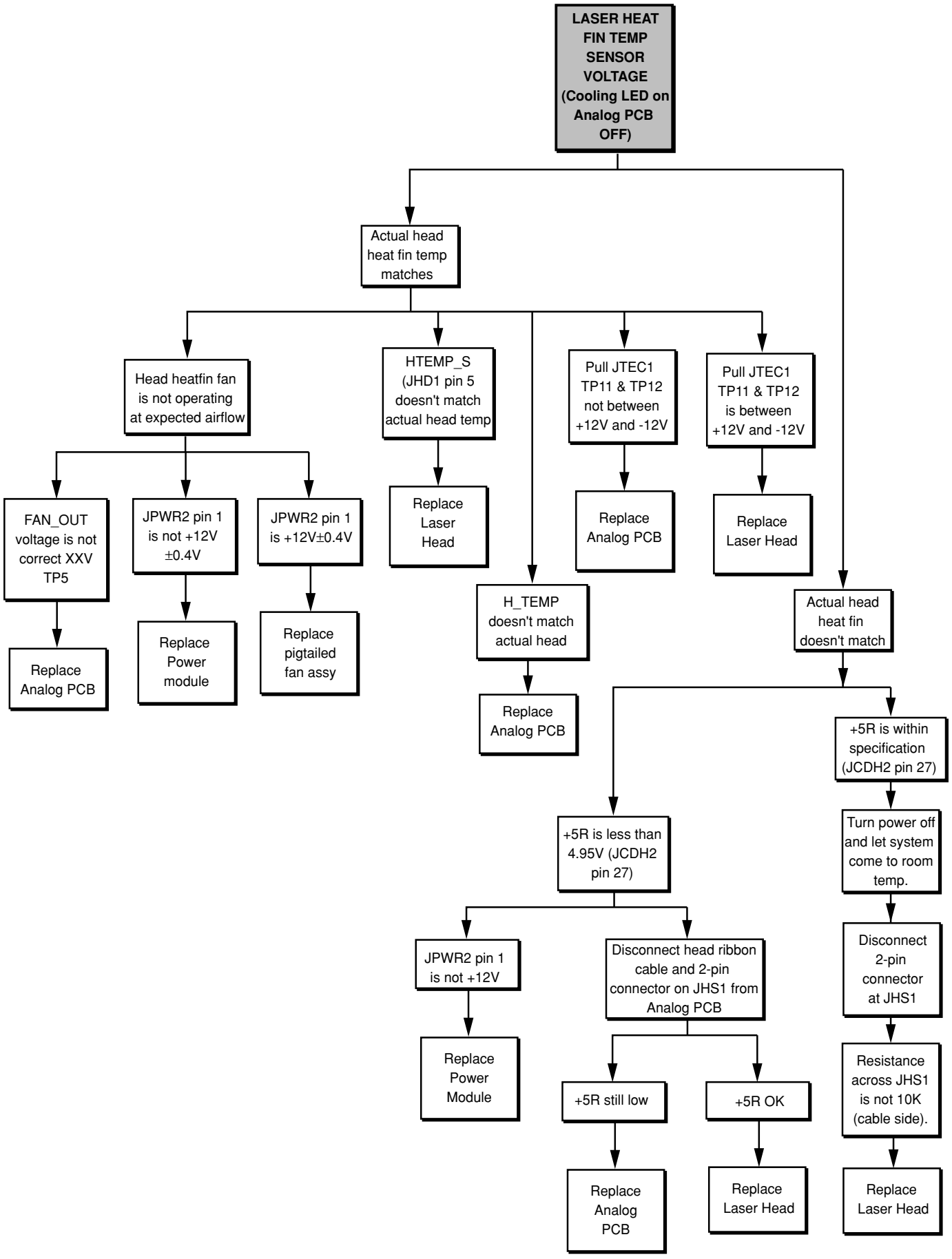


Figure 4-36
Laser Heat Fin Temperature Troubleshooting Tree

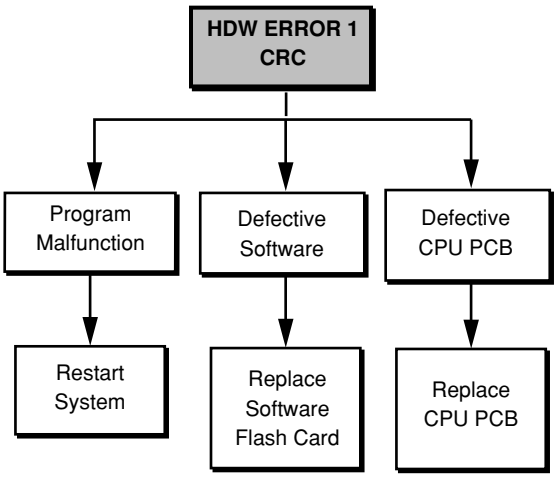


Figure 4-37
Hardware Error 1 (CRC)
Troubleshooting Tree

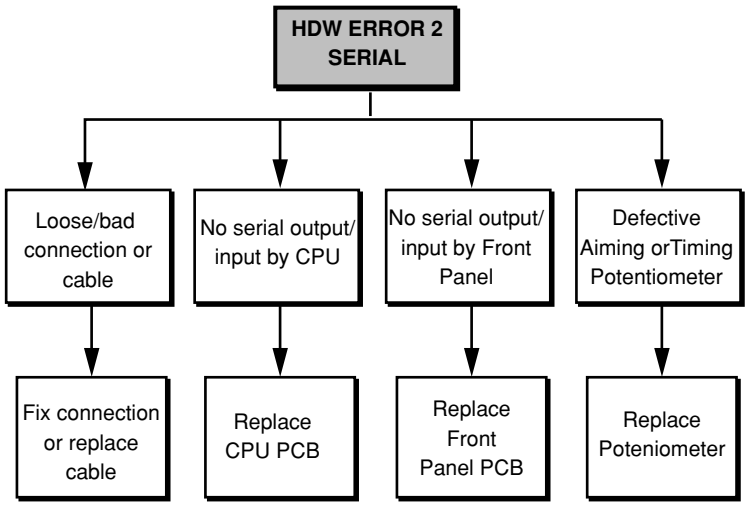


Figure 4-38
Hardware Error 2 (Serial)
Troubleshooting Tree

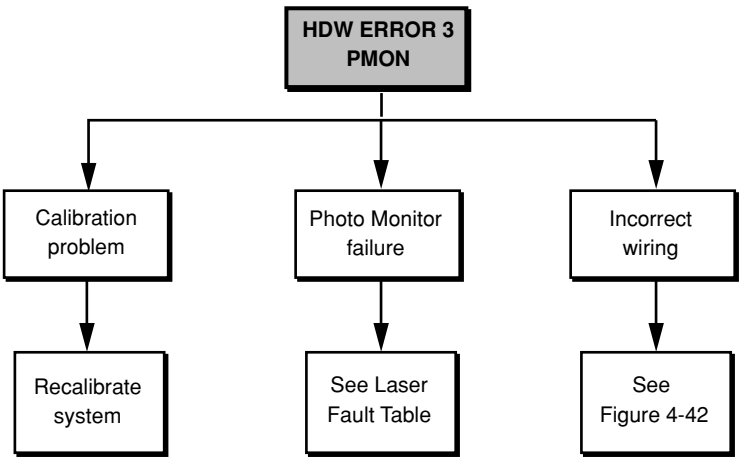


Figure 4-39
Hardware Error 3 (PMON) Troubleshooting Tree

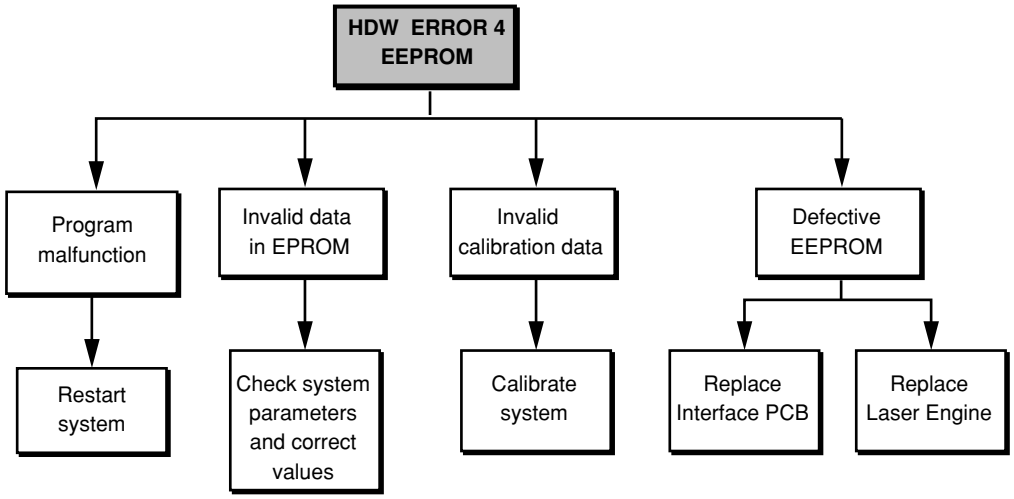


Figure 4-40
Hardware Error 4 (EEPROM) Troubleshooting Tree

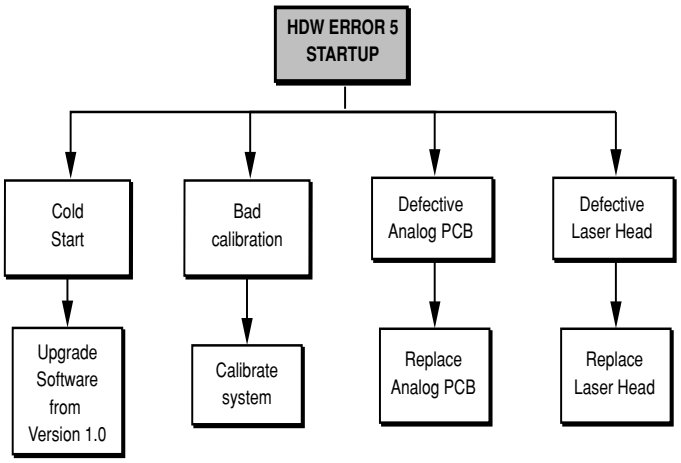


Figure 4-41
Hardware Error 5 (Startup)
Troubleshooting Tree

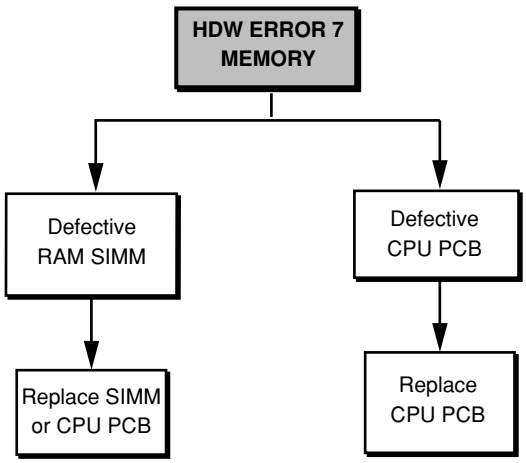


Figure 4-43
Hardware Error 7 (Memory)
Troubleshooting Tree

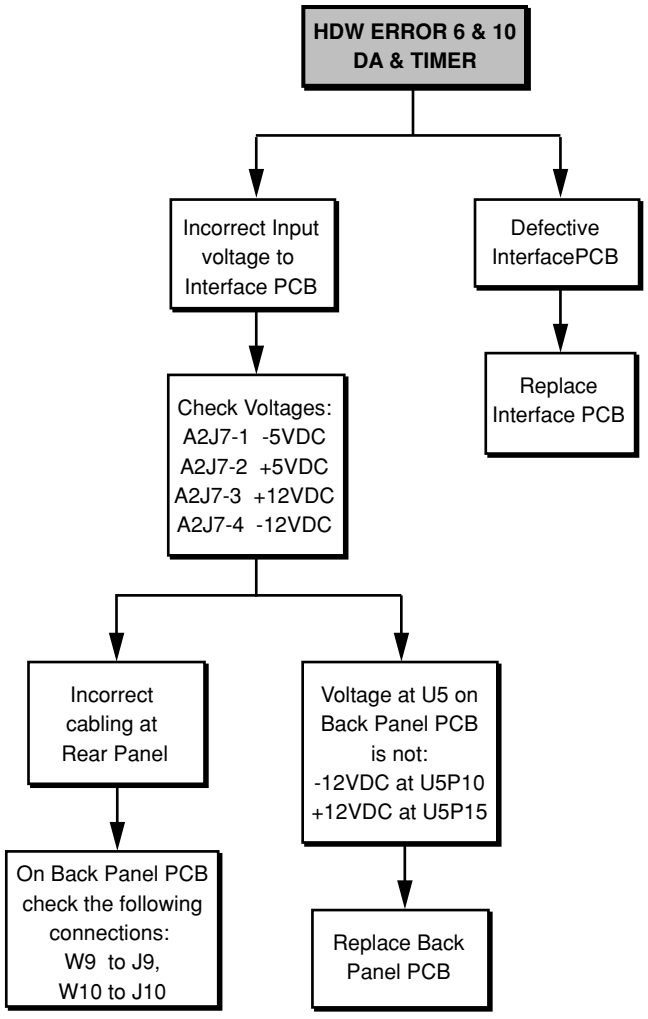


Figure 4-42
Hardware Error 6 (DA) and 10 (Timer)
Troubleshooting Tree

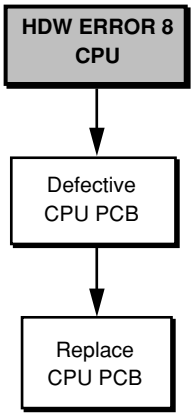


Figure 4-44
Hardware Error 8 (CPU) Troubleshooting Tree

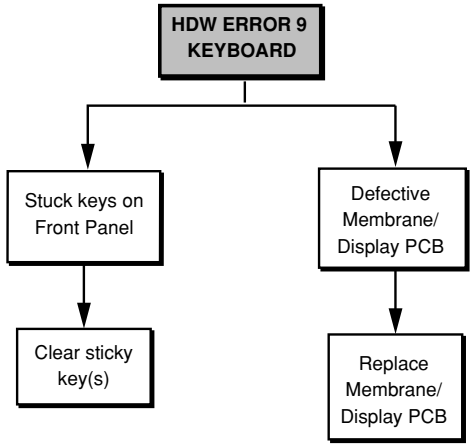


Figure 4-45
Hardware Error 9 (Keyboard) Troubleshooting Tree

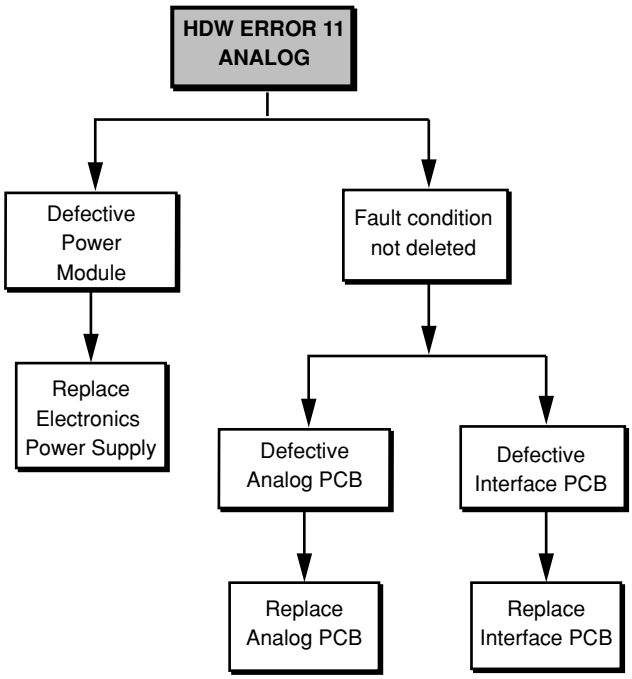


Figure 4-46
Hardware Error 11 (Analog) Troubleshooting Tree

TEST POINT AND LED DEFINITIONS

The following information is provided as an aid to troubleshooting the system. Refer to Section Two for detailed signal definitions.

Electronics Power Supply Test Points

Pin 1	+12V
Pin 2	+5
Pin 3	+ 5
Pin 4	GND
Pin 5	GND
Pin 6	-12
Pin 7	+24
Pin 8	GND

Laser Power Supply Test Points

Pin 1	-3.3
Pin 2	-3.3

Interface PCB Test Points

TP1	GND
TP2	CLKSYS
TP3	-IWR
TP4	CLK0
TP5	-IRD
TP6	-DG
TP7	CLK1
TP8	ADCLK
TP9	AA0
TP10	AA1
TP11	AA2
TP12	BD0
TP13	BD1
TP14	BD2
TP15	BD3
TP16	BD4
TP17	BD5
TP18	BD6
TP19	BD7
TP20	AGND

Analog PCB Test Points

TP1	Scope GND
TP2	GND
TP3	DIO_V
TP4	DBLR TEMP
TP5	FAN DRIVE
TP6	AGND
TP7	GND
TP8	DBLR DRIVE
TP9	DBLR THERM
TP10	GND
TP11	JTEC -
TP12	TEC+
TP13	GND

Analog PCB Fault LEDs

LED 1	DIO_PS
LED 2	FAULT
LED 3	WD_FLT
LED 4	V_FLT
LED 5	CUR_FLT
LED 6	ILCK_FLT
LED 7	HD_FLT
LED 8	OFF_FLT
LED 9	TMP_FLT

Optics PCB Test Points

TP1	AIM_BP
TP2	AIM_OD
TP3	OUT_1
TP4	OUT_2
TP5	ST_DRV
TP6	C3_DET
TP7	GND
TP8	ST_POS
TP9	ST_OUT
TP10	ST_AMP
TP11	C3AMP

Front Panel PCB Test Points

TP1	5V
TP2	GND
TP3	TX
TP4	RCV
TP5	OSC
TP6	BTN
TP7	KES
TP8	KRT
TP9	LGN
TP10	CLK

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SECTION FIVE
SCHEMATICS

CONTENTS

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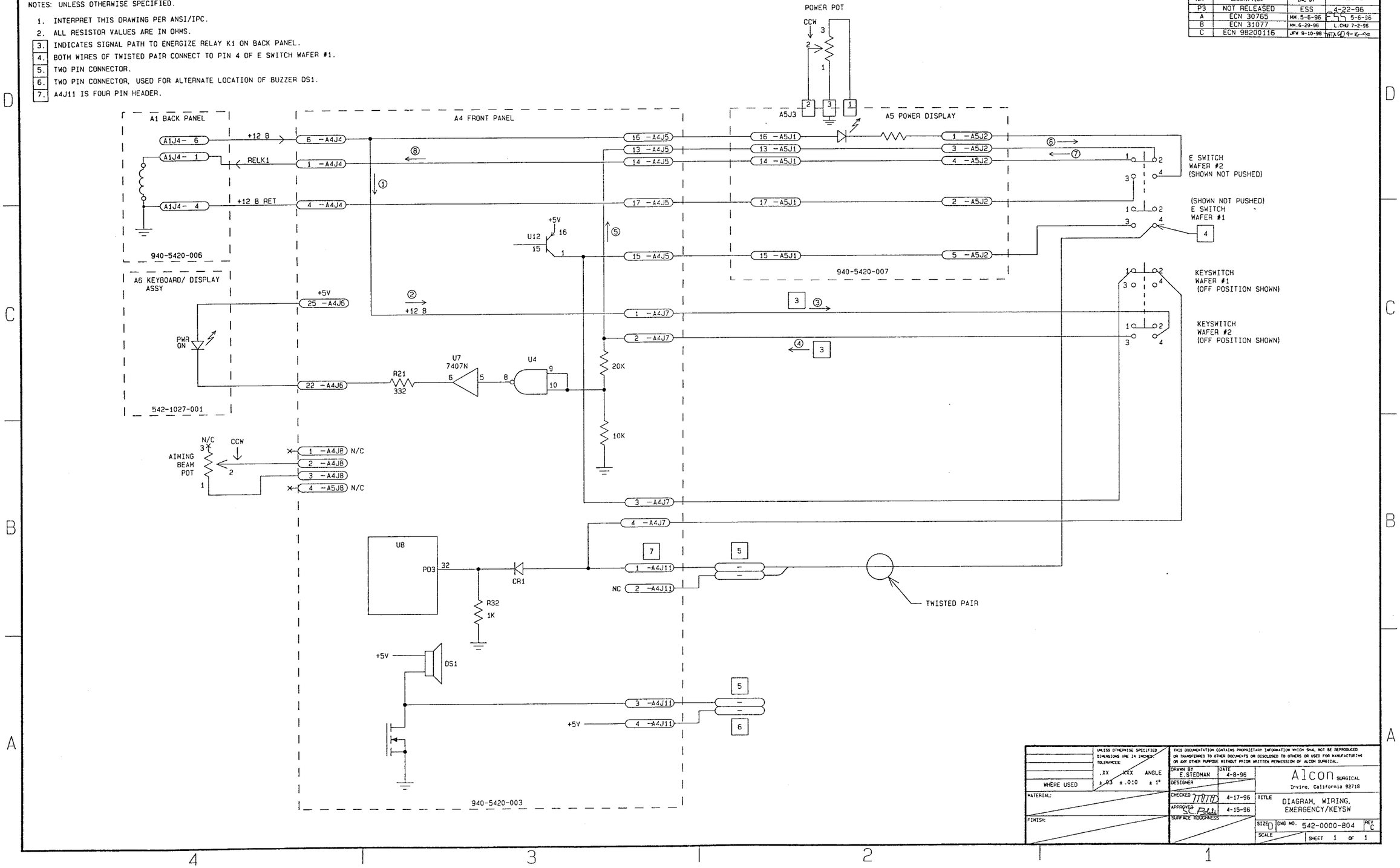
NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING PER ANSI/IPC.
2. ALL RESISTOR VALUES ARE IN OHMS.
3. INDICATES SIGNAL PATH TO ENERGIZE RELAY K1 ON BACK PANEL.
4. BOTH WIRES OF TWISTED PAIR CONNECT TO PIN 4 OF E SWITCH WAFER #1.
5. TWO PIN CONNECTOR.
6. TWO PIN CONNECTOR, USED FOR ALTERNATE LOCATION OF BUZZER DS1.
7. A4J11 IS FOUR PIN HEADER.

REVISIONS			
REV	DESCRIPTION	INC BY	APVD/DATE
P3	NOT RELEASED	ESS	4-22-96
A	ECN 30765	MM 5-6-96	5-6-96
B	ECN 31077	MM 6-29-96	L.CHU 7-2-96
C	ECN 98200116	JFW 9-10-98	9-16-98

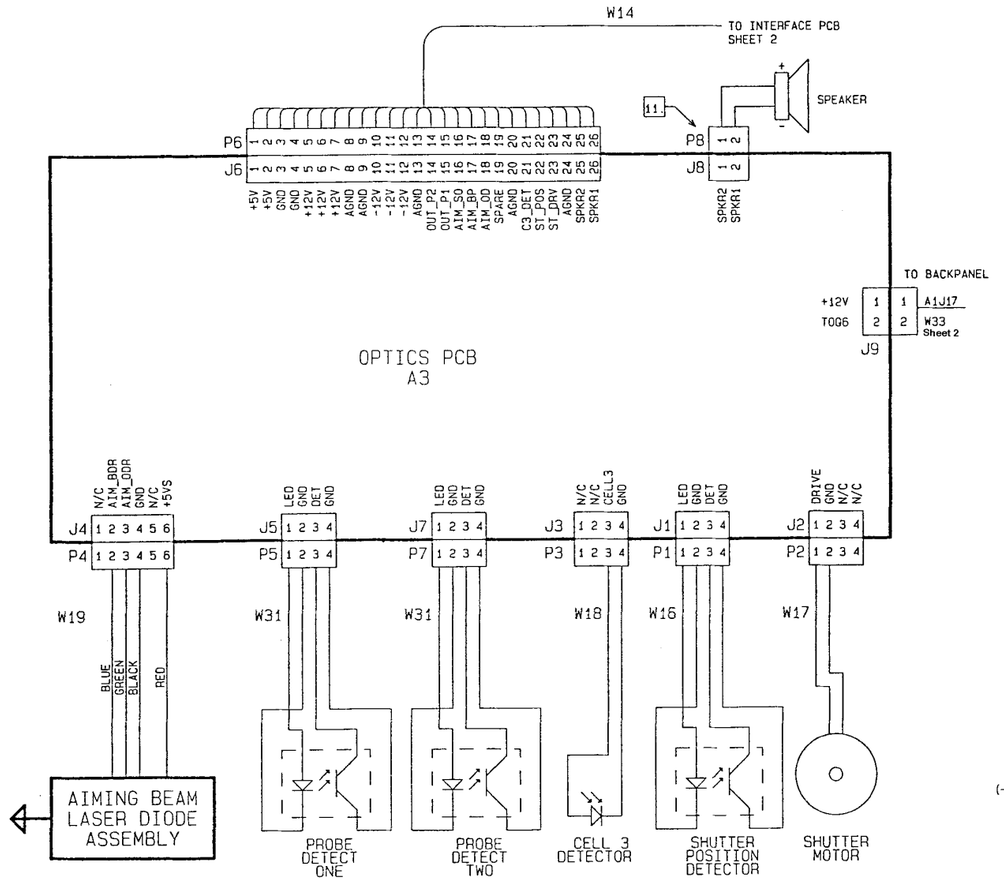


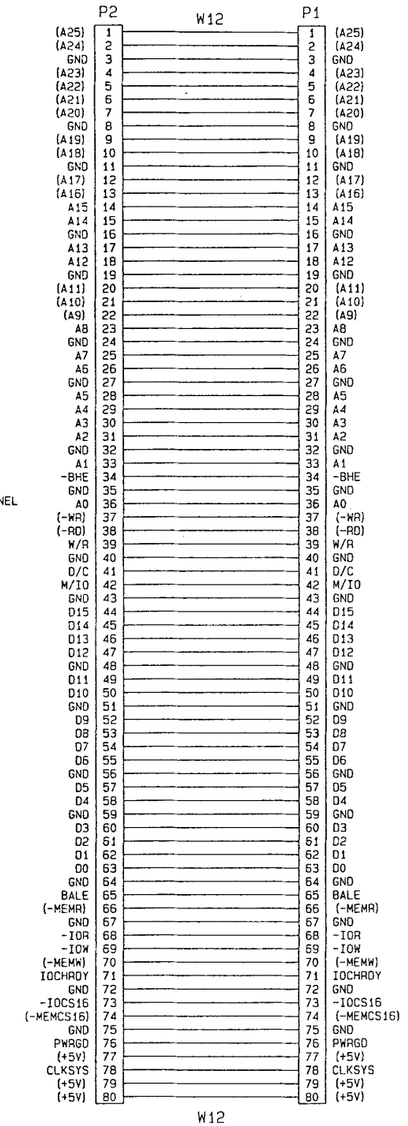
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: .XX ±.03 .XXX ±.010 ANGLE ±1°	THIS DOCUMENTATION CONTAINS PROPRIETARY INFORMATION WHICH SHALL NOT BE REPRODUCED OR TRANSFERRED TO OTHER DOCUMENTS OR DISCLOSED TO OTHERS OR USED FOR MANUFACTURING OR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION OF ALCON SURGICAL.		
WHERE USED	DRAWN BY E.STEDMAN	DATE 4-8-96	Alcon SURGICAL Irvine, California 92718
	DESIGNER		
MATERIAL:	CHECKED	4-17-96	TITLE DIAGRAM, WIRING, EMERGENCY/KEYSW
	APPROVED	4-15-96	
FINISH:	SURFACE ROUGHNESS		SIZE D DWG NO. 542-0000-804 REV C
			SCALE SHEET 1 OF 1

REVISIONS			
REV	DESCRIPTION	INC BY	APVD/DATE
P2	NOT RELEASED	ESS	4-22-96
A	ECN 30765	MM 5-6-96	ESS 5-6-96
B	ECN 31077	MM 6-29-96	ESS 7-2-96
C	ECN 31264	ESS 12-96	ESS 7-2-96
D	ECN 98200116	JFM 9-10-98	JFM 9-14-98

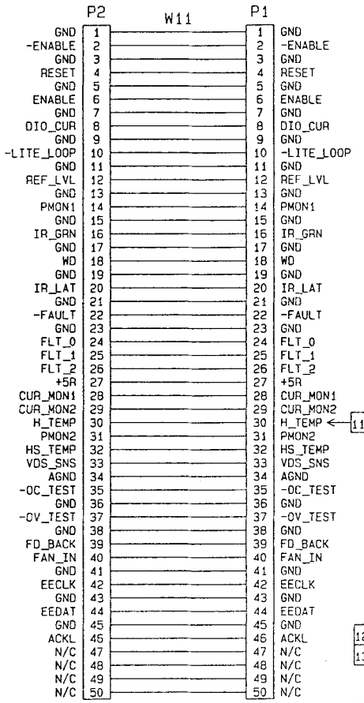
NOTES: UNLESS OTHERWISE SPECIFIED.

1. TWISTED PAIR.
2. BOTH LINES OF TWISTED PAIR CONNECT TO PIN 4.
3. CABLE RESERVED FOR FUTURE USE. CONNECTS TO REMOTELY LOCATED BUZZER, DS1, WHEN SO USED.
4. A20 IS FRONT PANEL OF CONSOLE.
5. 2 PIN CONNECTOR CONNECTS TO 4 PIN HEADER AS SHOWN.
6. CABLE IS PART OF LASER DIODE ASSEMBLY.
7. CABLES MADE FROM W31.
8. SIGNALS IN ( ) INDICATE SIGNALS CONNECTED ON CPU PCBA.
9. RESERVED. NO CONNECTION.
10. J11 THRU J16 ARE EXTERNAL HEADERS.
11. NOT CURRENTLY USED.
12. USE WITH INTEL CPU P/N EX386EXPLR1.
13. USE WIYH RADISYS CPU P/N EPC-41.





DETAIL A



DETAIL B

CABLES		
CABLE ASSY	PART NO.	QTY
W1	542-1055-001	1
W3	542-1056-001	1
W4	542-1057-001	1
W5	542-1058-001	1
W6	542-1059-001	1
W7	542-1060-001	1
W8	542-1061-001	1
W9	542-1062-001	1
12. W10	542-1063-001	1
13. W10	542-1063-002	1
W11	542-1080-001	1
W12	542-1064-001	1
11. W13	542-1065-001	1
W14	542-1066-001	1
W15	542-1067-001	1
W16	542-1068-001	1
W17	542-1069-001	1
W18	542-1070-001	1
6. W19	542-1048-001	1
W22	542-1071-001	1
W23	542-1072-001	1
W24	542-1073-001	1
W25	542-1074-001	1
W26	542-1075-001	1
W27	542-1076-001	1
W28	542-1077-001	1
W29	542-1078-001	1
W30	542-1079-001	1
W31	542-1099-001	2
W33	542-1101-001	1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: .XX ± .03, .XXX ± .010, ANGLE ± 1°

WHERE USED

MATERIAL:

FINISH:

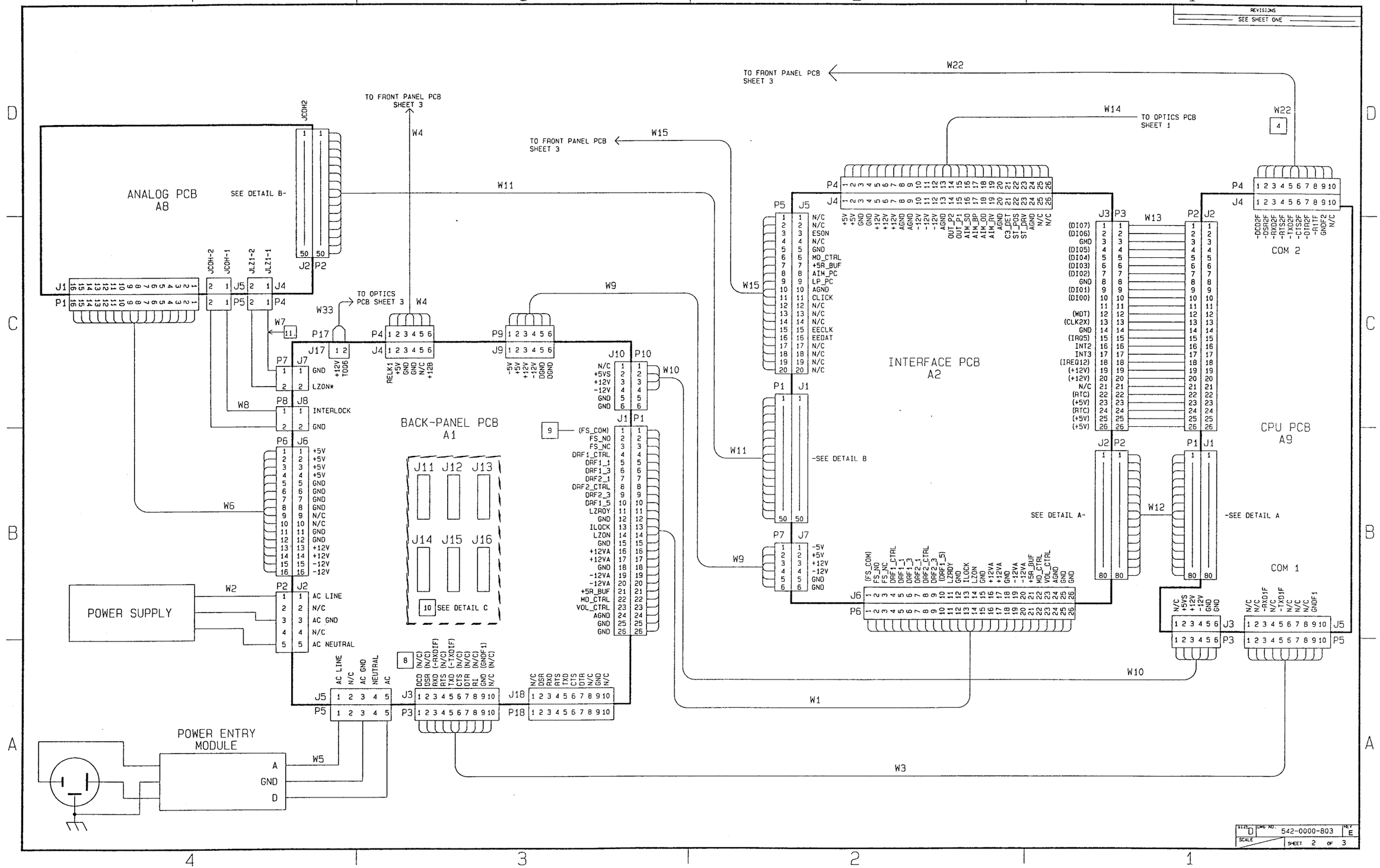
DRAWN BY	MMCO	DATE 9-15-95
DESIGNER	MMCO	9-15-95
CHECKED	ESS	4-29-96
APPROVED	SC Field	4-29-96
SURFACE ROUGHNESS		

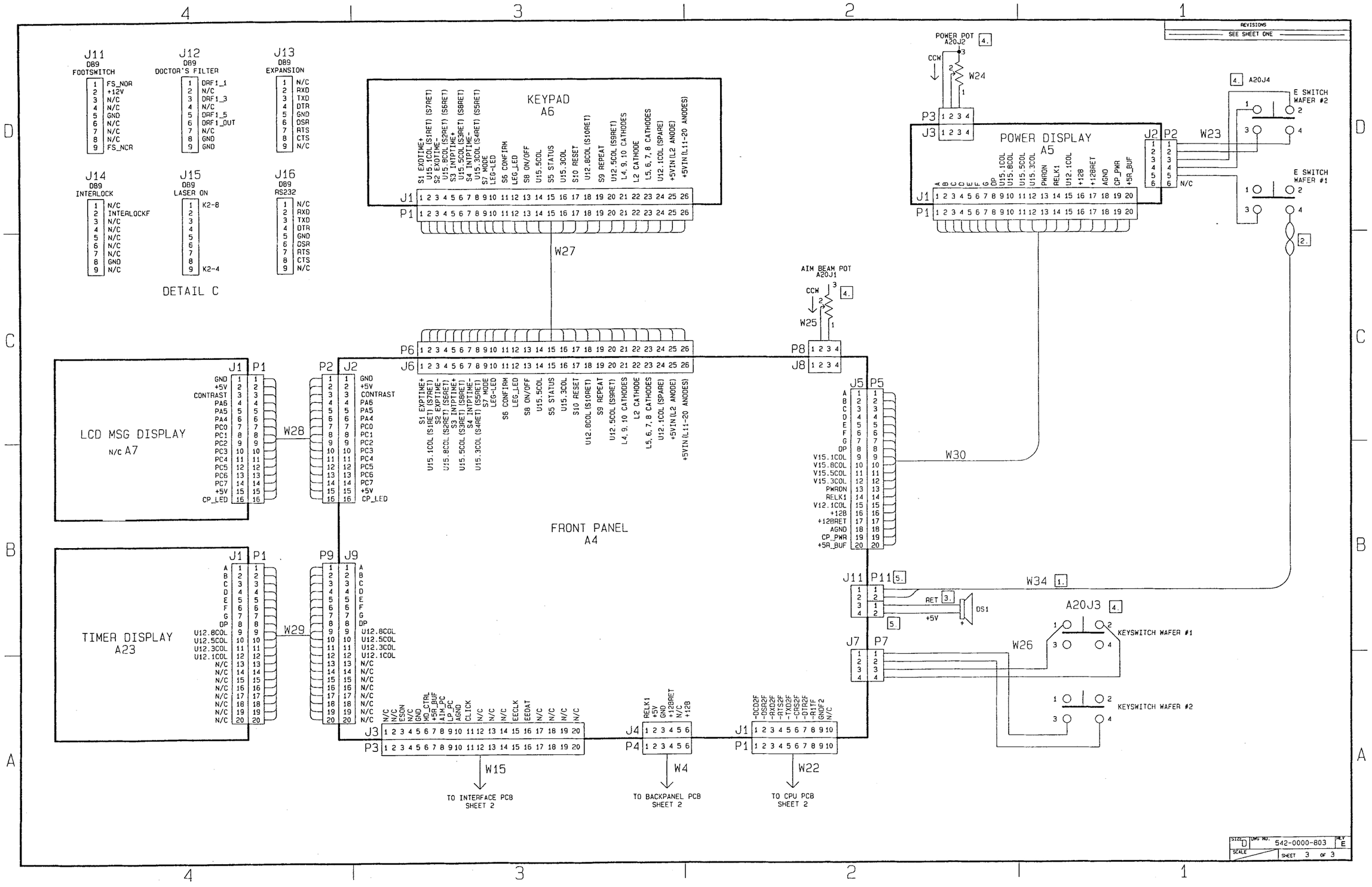
Alcon SURGICAL
Irvine, California 92618

TITLE: DIAGRAM, WIRING, SYSTEM, EYELITE

SIZE D | DWG NO. 542-0000-803 | REV E

SCALE | SHEET 1 OF 3

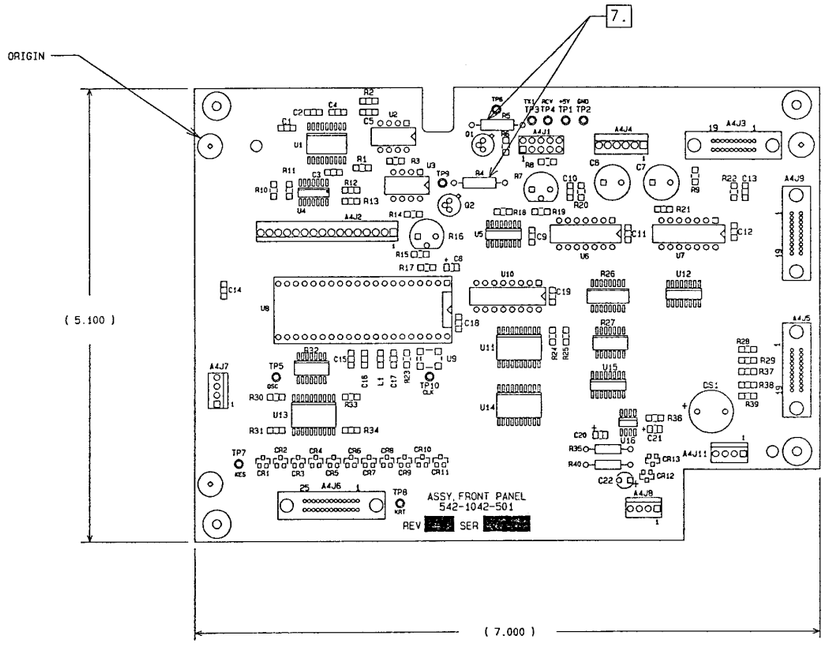

REVISIONS
SEE SHEET ONE
TO FRONT PANEL PCB SHEET 3
W22
W14
TO OPTICS PCB SHEET 1
W15
W4
W11
ANALOG PCB A8
SEE DETAIL B-
JCOH2
JCOH-2
JCOH-1
JLZ1-2
JLZ1-1
J1
P1
J5
P5
J4
P4
J2
P2
W7
W33
TO OPTICS PCB SHEET 3
P17
J17
W9
W8
W6
P7
J7
P8
J8
P6
J6
BACK-PANEL PCB A1
J11 J12 J13
J14 J15 J16
SEE DETAIL C
J10
P10
W10
J18
P18
W1
W3
W5
W2
POWER SUPPLY
POWER ENTRY MODULE
AC LINE
AC GND
NEUTRAL
INTERFACE PCB A2
-SEE DETAIL B
W12
SEE DETAIL A-
-SEE DETAIL A
W13
CPU PCB A9
COM 2
COM 1
J3
P3
P18
J5
P5
SIZE D
DWG NO. 542-0000-803
REV E
SCALE
SHEET 2 OF 3

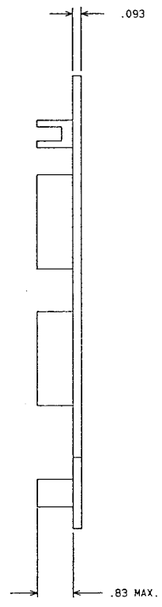

REVISIONS
SEE SHEET ONE
J11 DB9 FOOTSWITCH
1 FS_NOR
2 +12V
3 N/C
4 N/C
5 GND
6 N/C
7 N/C
8 N/C
9 FS_NCR
J12 DB9 DOCTOR'S FILTER
1 DRF1_1
2 N/C
3 DRF1_3
4 N/C
5 DRF1_5
6 DRF1_OUT
7 N/C
8 GND
9 GND
J13 DB9 EXPANSION
1 N/C
2 RXD
3 TXD
4 DTR
5 GND
6 DSR
7 RTS
8 CTS
9 N/C
J14 DB9 INTERLOCK
1 N/C
2 INTERLOCKF
3 N/C
4 N/C
5 N/C
6 N/C
7 N/C
8 GND
9 N/C
J15 DB9 LASER ON
1 K2-8
9 K2-4
J16 DB9 RS232
1 N/C
2 RXD
3 TXD
4 DTR
5 GND
6 DSR
7 RTS
8 CTS
9 N/C
DETAIL C
KEYPAD A6
S1 EXDITIME+ U15.1COL(S1RET) (S7RET)
S2 EXDITIME- U15.8COL(S2RET) (S6RET)
S3 INTPITIME+ U15.5COL(S3RET) (S8RET)
S4 INTPITIME- U15.3COL(S4RET) (S5RET)
S7 MODE
LED-LED
S6 CONFIRM
LED_LED
S8 ON/OFF
U15.5COL
S5 STATUS
U15.3COL
S10 RESET
U12.8COL(S10RET)
S9 REPEAT
U12.5COL(S9RET)
L4,9,10 CATHODES
L2 CATHODE
L5,6,7,8 CATHODES
U12.1COL(SPARE)
+5VIN(L2 ANODE)
+5VIN(L11-20 ANODES)
J1 P1
P6 J6
W27
POWER POT A20J2 4.
CCW
W24
P3 J3
POWER DISPLAY A5
J2 P2
W23
4. A20J4
E SWITCH WAFER #2
E SWITCH WAFER #1
2.
N/C
AIM BEAM POT A20J1 4.
W25
P8 J8
J5 P5
W30
LCD MSG DISPLAY
N/C A7
W28
FRONT PANEL
A4
TIMER DISPLAY
A23
W29
J11 P11 5.
W34 1.
RET 3.
+5V
DS1
A20J3 4.
KEYSWITCH WAFER #1
KEYSWITCH WAFER #2
J7 P7
W26
W15
TO INTERFACE PCB SHEET 2
W4
TO BACKPANEL PCB SHEET 2
W22
TO CPU PCB SHEET 2
SIZE D
DWG NO. 542-0000-803
REV E
SCALE
SHEET 3 OF 3

NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING PER ANSI/IPC-D-326.
2. PERMANENTLY MARK THE SERIAL NUMBER AND ASSEMBLY REVISION LETTER ON PCB.
3. REFERENCE SCHEMATIC 940-5420-003 AND NODED SCHEMATIC, 941-5420-003.
4. ASSEMBLE PER ALCON WORKMANSHIP STANDARDS WHERE APPLICABLE.
5. DETAILS ON ASSEMBLY DRAWING TAKE PRECEDENCE OVER WORKMANSHIP STANDARDS.
6. MASK 4 MOUNTING HOLES.
7. MOUNT R4 AND R5 FLUSH WITH BOARD SURFACE.
8. REF. MTP, 907-5420-004.
9. REF. FS, ICT, 995-5420-006.
10. REF. MSS, ICT, 996-5420-001.
11. REF. MOP/ICT, 992-0000-047.

REVISIONS			
REV	ECN	INC BY	APVD/DATE
P1	NOT RELEASED	MM 3-29-96	
A	ECN 30646	ESS	LChu 4-15-96
B	ECN 31031	MACD 5-24-96	Mm 6-25-96
C	ECN 31104	LChu 7-3-96	ESS 7-8-96
D	ECN 31206	ESS 8-1-96	Mm 8-1-96
E	ECN 31645	MACD 11-4-96	LChu 11-13-96





SEE SEPARATE PARTS LIST

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: XX ±.03 XXX ±.010 ANGLE ±1°	THIS DOCUMENTATION CONTAINS PROPRIETARY INFORMATION WHICH SHALL NOT BE REPRODUCED OR TRANSFERRED TO OTHER DOCUMENTS OR DISCLOSED TO OTHERS OR USED FOR MANUFACTURING OR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION OF ALCON SURGICAL
	WHERE USED	DRAWN M.MAI DATE 3-29-96	Alcon SURGICAL IRVINE, CALIFORNIA 92718
	MATERIAL	DESIGNER M.MAI 3-29-96	
		CHECKED 4-2-96	TITLE ASSY, PCB, FRONT PANEL
	FINISH	APPROVED 4-2-96	SIZE D DRAWING NO 542-1042-501 REV E
ASSEMBLY NUMBER		SURFACE ROUGHNESS	SCALE NONE SHEET 1 OF 1

NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING PER ANSI/IPC.
2. ALL RESISTOR VALUES ARE IN OHMS.
3. ALL CAPACITOR VALUES ARE IN MICROFARADS.
4. NOT USED, CR12, CR13.
5. R12 AND R13 ARE NOT GROUNDED ON REV. A FAB BOARD.

REVISIONS			
REV	DESCRIPTION	INC BY	APVD/DATE
P5	NOT RELEASED	MM 4-01-96	
A	ECN 30648	ESB	4-15-96
B	ECN 31031	MMCD 5-24-96	6-25-96
C	ECN 31645	MMCD 11-4-96	11-5-96

(TO BACK PANEL)

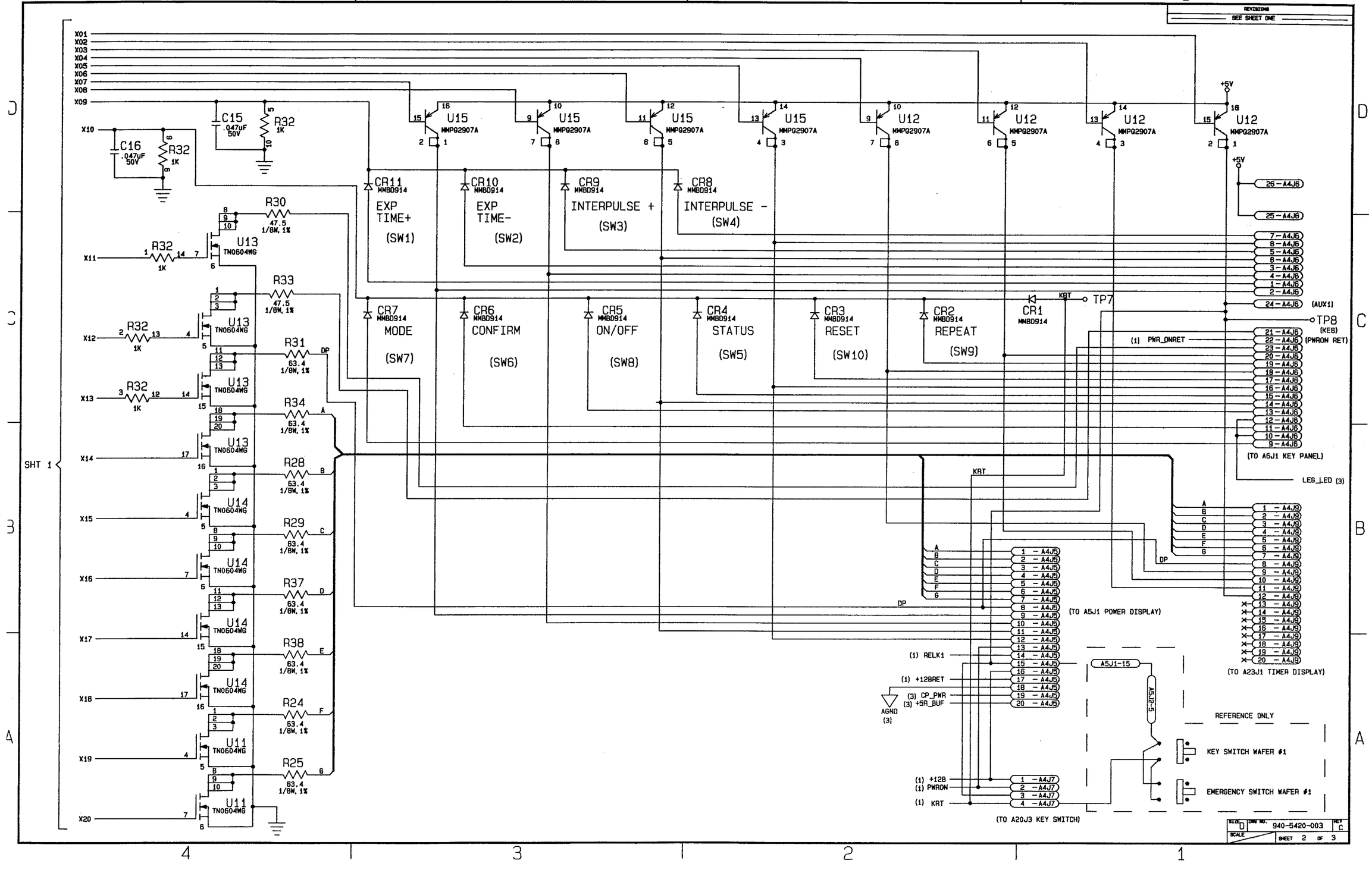
(TO MESSAGE DISPLAY)

SHT 2

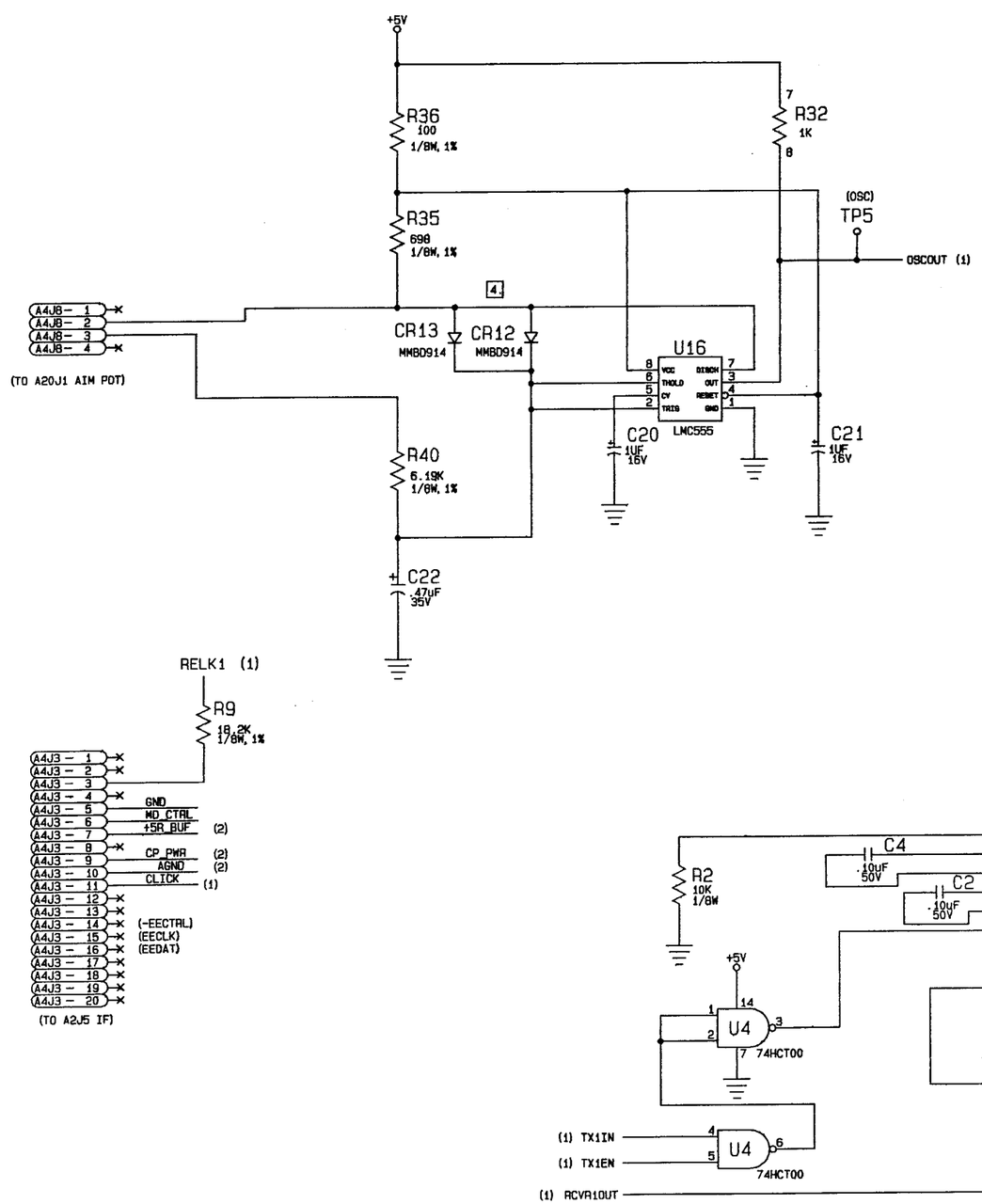
SPARES

REFERENCE DESIGNATORS	
LAST USED	NOT USED
A4J11	A4J10
C22	
CR11	
L1	
Q2	
U16	
TP10	

542-1042-501 WHERE USED	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: .XX ±.03 .XXX ±.010 ANGLE ±1°	DRAWN BY ASSOC DES 2-27-96	Alcon SURGICAL Irvine, California 92718
MATERIAL:		DESIGNER 4-1-96	
FINISH:		CHECKED 4-2-96	TITLE SCHEMATIC, PCB, FRONT PANEL
		APPROVED 4-2-96	
		SURFACE ROUGHNESS	SIZE D DWG NO. 940-5420-003 REV C
			SCALE SHEET 1 OF 3


REVISIONS
SEE SHEET ONE
X01
X02
X03
X04
X05
X06
X07
X08
X09
X10
X11
X12
X13
X14
X15
X16
X17
X18
X19
X20
C15 .047uF 50V
C16 .047uF 50V
R32 1K
R30 47.5 1/8W, 1%
R33 47.5 1/8W, 1%
R31 63.4 1/8W, 1%
R34 63.4 1/8W, 1%
R28 63.4 1/8W, 1%
R29 63.4 1/8W, 1%
R37 63.4 1/8W, 1%
R38 63.4 1/8W, 1%
R24 63.4 1/8W, 1%
R25 63.4 1/8W, 1%
U13 TN0604WG
U14 TN0604WG
U11 TN0604WG
U15 MMPQ2907A
U12 MMPQ2907A
+5V
CR11 MMBD914 EXP TIME+ (SW1)
CR10 MMBD914 EXP TIME- (SW2)
CR9 MMBD914 INTERPULSE + (SW3)
CR8 MMBD914 INTERPULSE - (SW4)
CR7 MMBD914 MODE (SW7)
CR6 MMBD914 CONFIRM (SW6)
CR5 MMBD914 ON/OFF (SW8)
CR4 MMBD914 STATUS (SW5)
CR3 MMBD914 RESET (SW10)
CR2 MMBD914 REPEAT (SW9)
CR1 MMBD914
KRT
TP7
TP8 (KES)
(AUX1)
(1) PWR_ONRET
(PWRON RET)
26 – A4J6
25 – A4J6
7 – A4J5
8 – A4J5
5 – A4J5
6 – A4J5
3 – A4J5
4 – A4J5
1 – A4J5
2 – A4J5
24 – A4J6
21 – A4J6
22 – A4J6
23 – A4J6
20 – A4J6
19 – A4J6
18 – A4J6
17 – A4J6
16 – A4J6
15 – A4J6
14 – A4J6
13 – A4J6
12 – A4J6
11 – A4J6
10 – A4J6
9 – A4J6
(TO A6J1 KEY PANEL)
LED_LED (3)
KRT
A – 1 – A4J9
B – 2 – A4J9
C – 3 – A4J9
D – 4 – A4J9
E – 5 – A4J9
F – 6 – A4J9
G – 7 – A4J9
DP – 8 – A4J9
9 – A4J9
10 – A4J9
11 – A4J9
12 – A4J9
13 – A4J9
14 – A4J9
15 – A4J9
16 – A4J9
17 – A4J9
18 – A4J9
19 – A4J9
20 – A4J9
(TO A23J1 TIMER DISPLAY)
A – 1 – A4J5
B – 2 – A4J5
C – 3 – A4J5
D – 4 – A4J5
E – 5 – A4J5
F – 6 – A4J5
G – 7 – A4J5
DP – 8 – A4J5
9 – A4J5
10 – A4J5
11 – A4J5
12 – A4J5
13 – A4J5
14 – A4J5
15 – A4J5
16 – A4J5
17 – A4J5
18 – A4J5
19 – A4J5
20 – A4J5
(TO A5J1 POWER DISPLAY)
(1) RELK1
(1) +12BRET
(3) CP_PWR
(3) +5A_BUF
AGND (3)
A5J1-15
A5J2-5
REFERENCE ONLY
KEY SWITCH WAFER #1
EMERGENCY SWITCH WAFER #1
(1) +12B
(1) PWRON
(1) KRT
1 – A4J7
2 – A4J7
3 – A4J7
4 – A4J7
(TO A20J3 KEY SWITCH)
SHT 1
SIZE D
DWG NO. 940-5420-003
REV C
SCALE
SHEET 2 OF 3

REVISIONS
SEE SHEET ONE

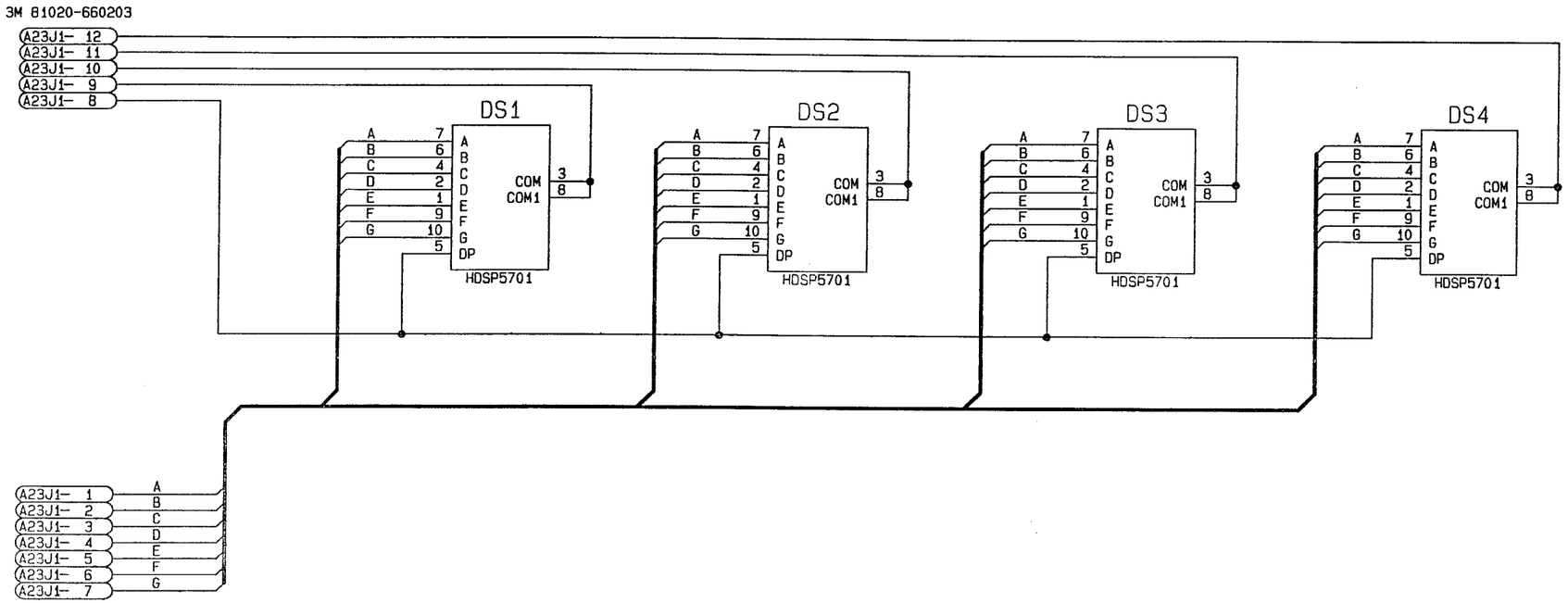


SIZE	DWG NO.	REV
D	940-5420-003	C
SCALE	SHEET 3 OF 3	

NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING PER ANSI/IPC.
2. ALL RESISTOR VALUES ARE IN OHMS.
3. PCBA IS IDENTIFIED AS A23.
4. REF PCB ASSY DWG 542-1030-001.

REVISIONS			
REV	DESCRIPTION	INC BY	APVD/DATE
P1	NOT RELEASED	MR	11-17-95
A	30230	[illegible]	MM 1-29-96
B	30347	[illegible]	[illegible] 2-27-96



SPARES

REFERENCE DESIGNATORS	
LAST USED	NOT USED
DS4	
J1	

WHERE USED

MATERIAL:

FINISH:

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: .XX ± .03 XXX ± .010 ANGLE ± 1°

DRAWN BY H.P. DATE 8-7-95
DESIGNER
CHECKED MM 11-20-95
APPROVED
SURFACE ROUGHNESS

Alcon SURGICAL
Irvine, California 92718

TITLE SCHEMATIC, FP TIMER DISPLAY

SIZE C DWG NO. 940-5420-008 REV B
SCALE SHEET 1 OF 1

NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING PER ANSI/IPC.
2. ALL RESISTOR VALUES ARE IN OHMS.
3. PCBA IS IDENTIFIED AS A5.
4. REF PCB ASSY DWG 542-1027-001.

REVISIONS			
REV	DESCRIPTION	INC BY	APVD/DATE
P2	NOT RELEASED	MM	11-27-95
A	30230	[illegible]	Mm 1-29-96
B	30347	[illegible]	[illegible] 2-27-96

3M81020-660203

A5J1- 12
A5J1- 11
A5J1- 10
A5J1- 9
A5J1- 8

DS1 DS2 DS3 DS4

HDSP3901

A5J1- 1 A
A5J1- 2 B
A5J1- 3 C
A5J1- 4 D
A5J1- 5 E
A5J1- 6 F
A5J1- 7 G

POWER ADJ POT
(LOCATED ON FRONT PANEL)
REF ONLY

A5J1- 20 — 1 -A5J3
A5J1- 19 — 2 -A5J3
A5J1- 18 — 3 -A5J3

R1
CCW
AGND

J3 AMP 640456-4
ALCON 053-451

CR1
T1LED

R1
620
.25W_5%

EMERGENCY LAMP/SW
(LOCATED ON FRONT PANEL)
REF ONLY

A5J1- 16 — 1 - A5J2
A5J1- 17 — 2 - A5J2
A5J1- 13 — 3 - A5J2
A5J1- 14 — 4 - A5J2
A5J1- 15 — 5 - A5J2

SPARE — 6 - A5J2

J2 AMP 640456-6
ALCON 053-453

KEY SWITCH (LOCATED
ON FRONT PANEL)
REF ONLY

REF ONLY
4 -A4J7

EMER SWITCH
(LOCATED ON FRONT
PANEL)
REF. ONLY

REFERENCE DESIGNATORS	
LAST USED	NOT USED
CR1	
DS4	
J3	
R1	

A5J3- 4

SPARES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES:
.XX ± .03 XXX ± .010 ANGLE ± 1°

WHERE USED
MATERIAL:
FINISH:

DRAWN BY E.STEDMAN	DATE 4-24-95
DESIGNER	
CHECKED Mm	11-20-95
APPROVED [illegible]	1-10-96
SURFACE ROUGHNESS	

Alcon SURGICAL
Irvine, California 92718

TITLE SCHEMATIC,
FP POWER DISPLAY

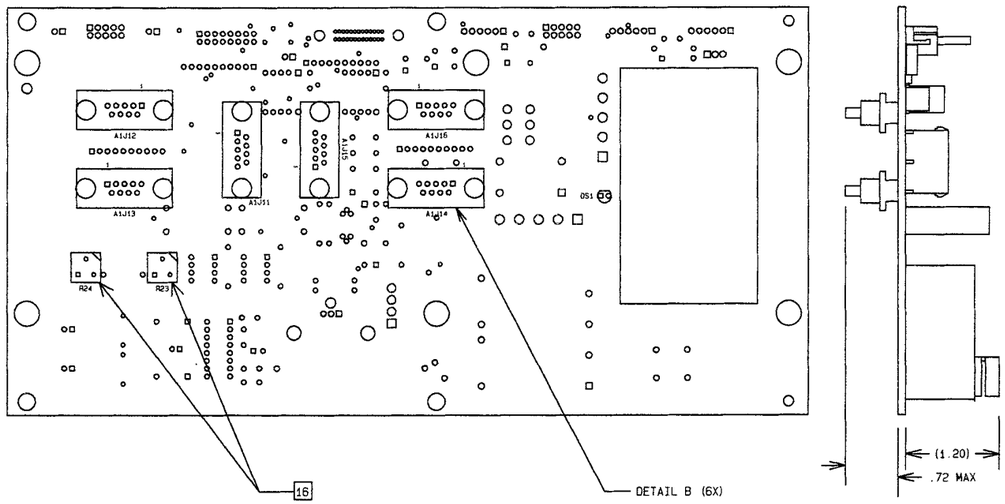
SIZE C | DWG NO. 940-5420-007 | REV B
SCALE | SHEET 1 OF 1

NOTES: UNLESS OTHERWISE SPECIFIED.

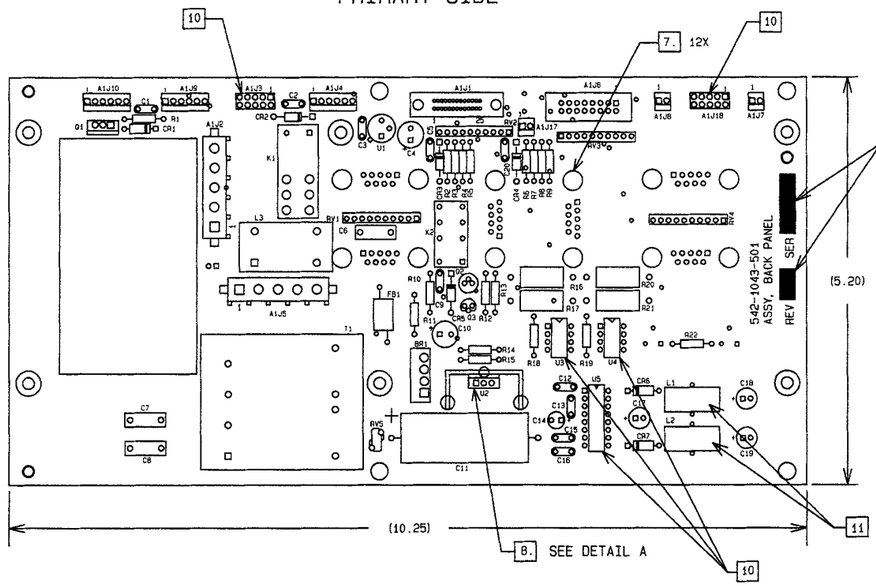
1. INTERPRET THIS DRAWING PER ANSI/IPC-D-326.
2. REFERENCE SCHEMATIC 940-5420-006 AND NODED SCHEMATIC, 941-5420-006.
3. ASSEMBLE PER ALCON WORKMANSHIP STANDARDS WHERE APPLICABLE.
4. DETAILS ON ASSEMBLY DRAWING TAKE PRECEDENCE OVER WORKMANSHIP STANDARDS.
5. PERMANENTLY MARK SERIAL NUMBER AND ASSEMBLY REVISION LETTER ON PCB.
6. MASK LOCATIONS T1, L1, L2, AND DS1, A1J11 TO A1J16, R23, R24, AND 6 MOUNTING HOLES.
7. PRIOR TO SOLDERING (DETAIL B). ATTACH DB9 CONNECTORS (ITEM 4 AND 6) WITH SCREW (ITEM 70) AND LOCKWASHER (ITEM 71).
8. MOUNT U2 TO HEATSINK WITH ITEM 68.
9. APPLY ITEM 72 TO HEATSINK TABS (DETAIL A).
10. LEAD PROTRUSIONS LESS THAN .020" ARE ACCEPTABLE.
11. APPLY ITEM 73 AROUND L1 AND L2 IN FINAL ASSEMBLY.
12. REF. MTP, 907-5420-005.
13. REF. FS, 995-5420-007.
14. REF. MSS, 996-5420-002.
15. REF. MOP/ICT, 992-0000-047.
16. HARDWARE TO BE INSTALLED AS A PART OF ITEM 42.

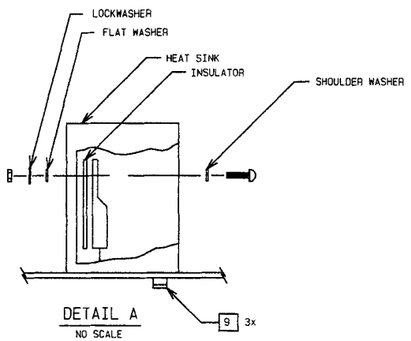
REVISIONS			
REV	ECN	INC BY	APVD/DATE
P2	NOT RELEASED	ESS	3-27-96
A	ECN 30636	ESS	4-12-96
B	ECN 30863	ESS	5-20-96
C	ECN 30911	6-3-96	6-10-96
D	ECN 31195	8-1-96	8-5-96
E	ECN 31228	JG 8-6-96	8-6-96
F	ECN 31795	MMcD 11-26-96	12-2-96
G	ECN 31804	MMcD 11-27-96	12-2-96
H	ECN 32847	9-8-97	9-9-97
J	ECN 99200116	2-12-99	MMcD 2-15-99
K	ECN 99200358	4-28-99	MMcD 4-29-99
L	ECN 20002393	4-14-00	MMcD 4-19-00
M	ECN 20013066	9-14-01	MMcD 9-14-01

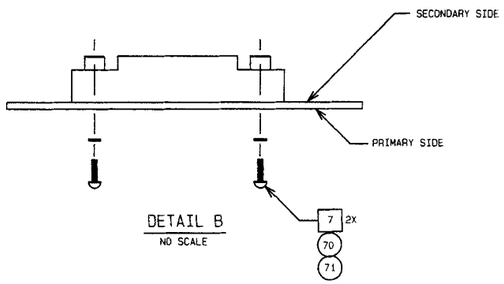
SECONDARY SIDE



PRIMARY SIDE







SEE SEPARATE PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
XX ±.03 XXX ±.010 ANGLE ±1°

WHERE USED

MATERIAL

FINISH

ASSEMBLY NUMBER

DRAWN	E.STEDMAN	DATE 3-27-96
DESIGNER	ESS	3-27-96
CHECKED	JGW	4-2-96
APPROVED	SCPeki	4-2-96
SURFACE ROUGHNESS		

Alcon SURGICAL
IRVINE, CALIFORNIA 92718

TITLE: ASSY, PCB, PANEL, BACK

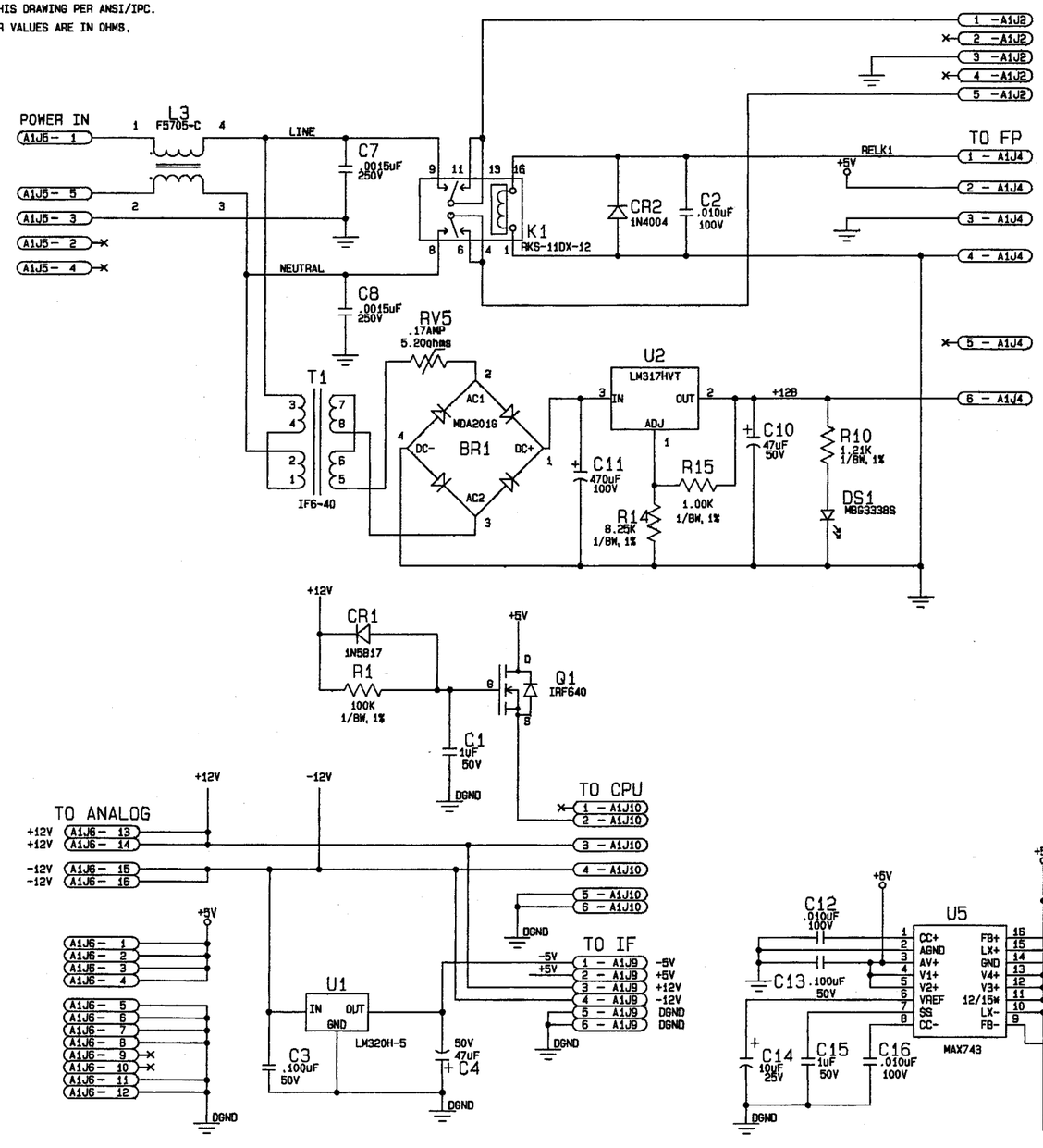
SIZE D | DRAWING NO. 542-1043-501 | REV M

SCALE NONE | SHEET 1 OF 1

NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING PER ANSI/IPC.
2. ALL RESISTOR VALUES ARE IN OHMS.

REVISIONS			
REV	DESCRIPTION	INC BY	APVD/DATE
P3	NOT RELEASED	ESS	3-13-96
A	ECN 30636	ESS	4-12-96
B	ECN 30863	ESS	5-30-96



REFERENCE DESIGNATORS	
LAST USED	NOT USED
C20	
CR7	
A1J18	
Q3	
U5	
L2	
K2	
BR1	
R24	
FB1	
RV5	

542-1043-501
WHERE USED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: .XX ±.03 .XXX ±.010 ANGLE ±1°

MATERIAL:

FINISH:

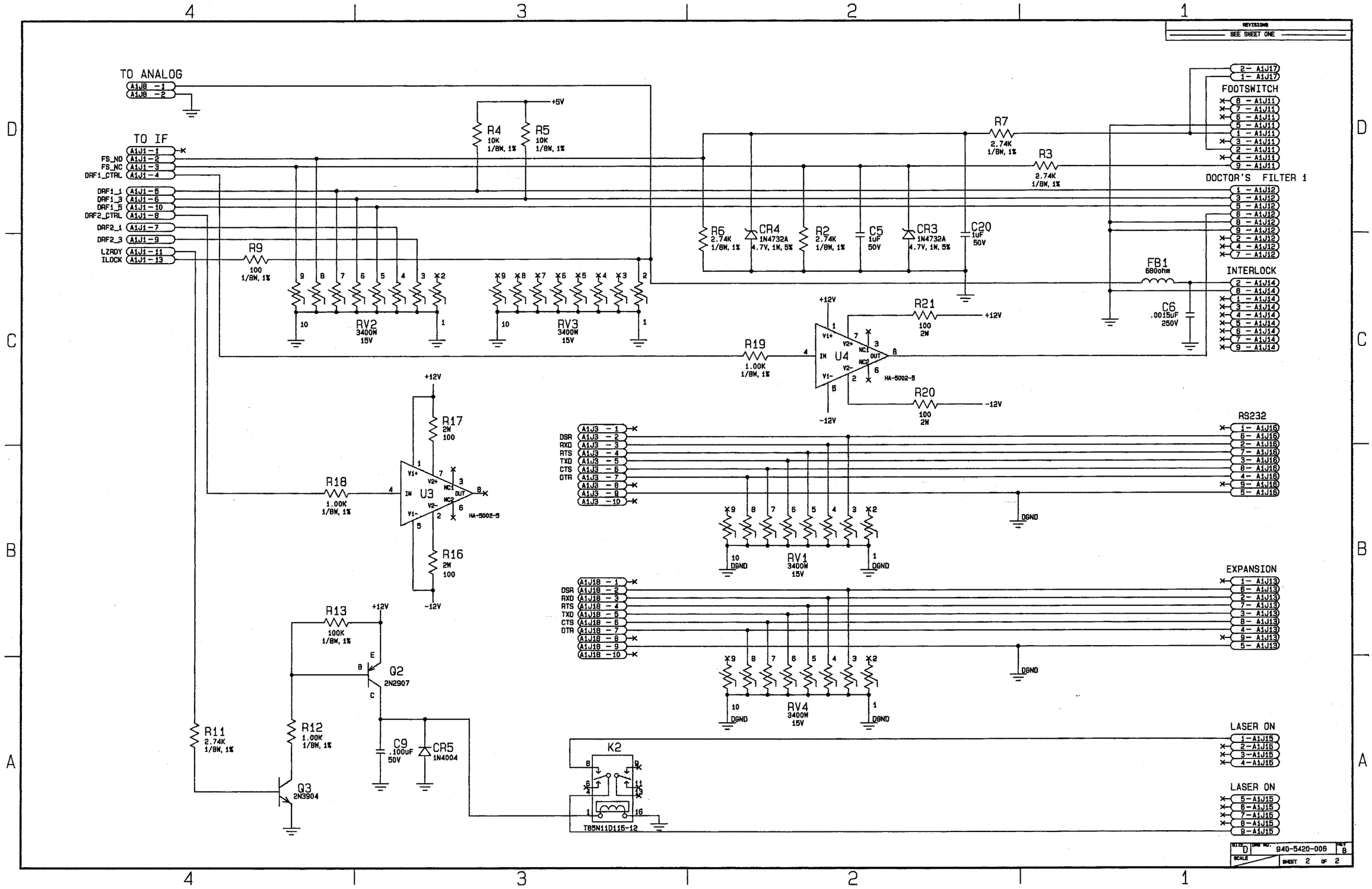
DRAWN BY	E.STEDMAN	DATE 2-8-96
DESIGNER		
CHECKED		4-2-96
APPROVED		3-21-96
SURFACE MOUNTED		

Alcon SURGICAL
Irvine, California 92718

TITLE: SCHEMATIC, PCB, BACK PANEL

SIZE D | DWG NO. 940-5420-005 | REV B

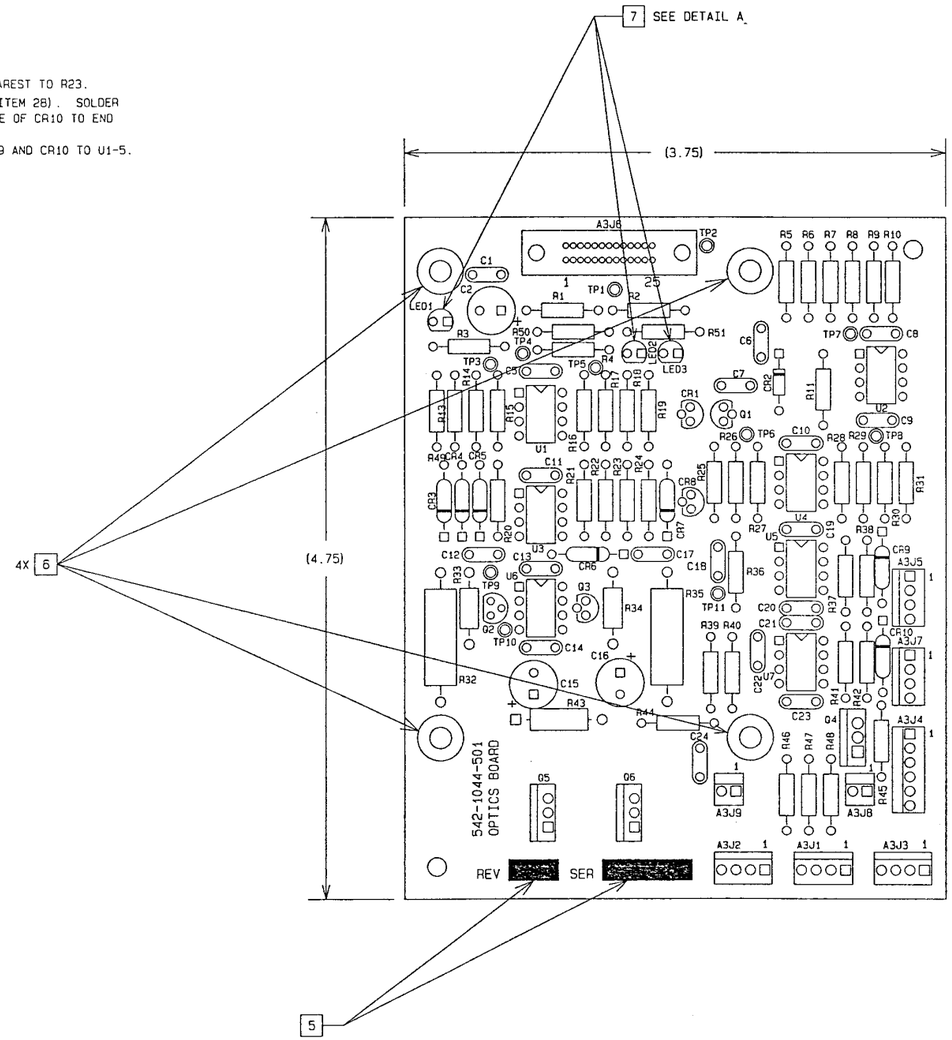
SCALE | SHEET 1 OF 2

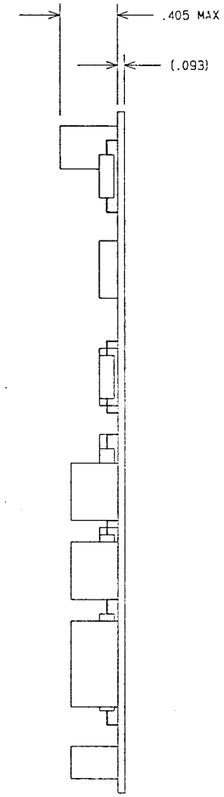

REVISIONS
SEE SHEET ONE
TO ANALOG
A1J8 -1
A1J8 -2
TO IF
A1J1-1
A1J1-2
A1J1-3
A1J1-4
A1J1-5
A1J1-6
A1J1-10
A1J1-8
A1J1-7
A1J1-9
A1J1-11
A1J1-13
FS_NO
FS_NC
DRF1_CTRL
DRF1_1
DRF1_3
DRF1_5
DRF2_CTRL
DRF2_1
DRF2_3
LZRDY
ILOCK
+5V
R4
10K
1/8W, 1%
R5
10K
1/8W, 1%
R7
2.74K
1/8W, 1%
R3
2.74K
1/8W, 1%
R6
2.74K
1/8W, 1%
CR4
1N4732A
4.7V, 1W, 5%
R2
2.74K
1/8W, 1%
C5
1uF
50V
CR3
1N4732A
4.7V, 1W, 5%
C20
1uF
50V
R9
100
1/8W, 1%
RV2
3400W
15V
RV3
3400W
15V
FOOTSWITCH
DOCTOR'S FILTER 1
FB1
680ohm
INTERLOCK
C6
.0015uF
250V
R19
1.00K
1/8W, 1%
+12V
R21
100
2W
-12V
R20
100
2W
U4
HA-5002-5
R17
2W
100
R18
1.00K
1/8W, 1%
U3
HA-5002-5
R16
2W
100
RS232
DSR
RXD
RTS
TXD
CTS
DTR
RV1
3400W
15V
DGND
EXPANSION
RV4
3400W
15V
R13
100K
1/8W, 1%
Q2
2N2907
R11
2.74K
1/8W, 1%
R12
1.00K
1/8W, 1%
C9
100UF
50V
CR5
1N4004
Q3
2N3904
K2
T85N11D115-12
LASER ON
940-5420-006
SHEET 2 OF 2

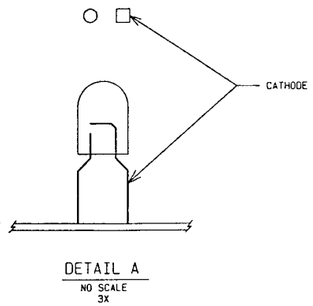
NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING PER ANSI/IPC-D-326.
2. REFERENCE SCHEMATIC 940-5420-005 & 941-5420-005.
3. ASSEMBLE PER ALCON WORKMANSHIP STANDARDS WHERE APPLICABLE.
4. DETAILS ON ASSEMBLY DRAWING TAKE PRECEDENCE OVER WORKMANSHIP STANDARDS.
5. MARK ASSY REV AND SERIAL NO. APPROX WHERE SHOWN.
6. MASK 4 MOUNTING HOLES
7. INSTALL LED'S PER DETAIL A, FOR POSITIONING AND POLARITY.
8. INSTALL ZERO OHM JUMPER RESISTOR, PART NO. 208-000 AT R12. FOR REV. A FAB BOARDS.
9. REWORK REV A, B, AND C, FAB ONLY AS FOLLOWS:
   A. CUT TRACE ON COMPONENT SIDE BETWEEN U1-5 AND U3-6.
   B. REMOVE C3 AND C4.
      INSTALL R50 (ITEM 44) AT C3.
      INSTALL R51 (ITEM 44) AT C4.
   C. INSTALL R49 (ITEM 44) BETWEEN U1-5 AND END OF R18 NEAREST TO R23.
   D. SOLDER CATHODE OF CR9 (ITEM 28) TO CATHODE OF CR10 (ITEM 28). SOLDER ANODE OF CR9 TO END OF R38 NEAREST R42. SOLDER ANODE OF CR10 TO END OF R42 NEAREST R45.
   E. CONNECT JUMPER WIRE (ITEM 45) BETWEEN CATHODES OF CR9 AND CR10 TO U1-5.
10. TEST PER MTP 907-5420-006.
11. REF. SOFTWARE SPEC. 996-5420-003.
12. REF. FIXTURE SPEC. 995-5420-008.
13. REF. MOP, ICT, 992-0000-047.

REVISIONS			
REV	ECN	INC BY	APVD/DATE
P1	NOT RELEASED	ESS 3-1-96	
A	30491	ESS 3-12-96	3-12-96
B	30823	5-15-96	ESS 5-17-96
C	31031	MMcD 6-24-95	6-25-96
D	31264	ESS 8-12-96	8-15-96
E	ECN 31372	ESS 9-02-96	9-3-96
F	ECN 31795	MMcD 11-26-96	1-27-96
G	ECN 31867	ESS 12-17-96	12-19-96







DETAIL A
NO SCALE
3X

SEE SEPARATE PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
XX ±.03 XXX ±.010 ANGLE ±1°

WHERE USED
MATERIAL
FINISH
ASSEMBLY NUMBER
SURFACE ROUGHNESS

DRAWN	E.STEDMAN	DATE 3-1-96
DESIGNER	ESS	3-1-96
CHECKED		3-4-96
APPROVED		3-1-96

Alcon SURGICAL
IRVINE, CALIFORNIA 92718

TITLE: ASSY, PCB, OPTICS

SIZE	DRAWING NO.	REV
D	542-1044-501	G

SCALE NONE SHEET 1 OF 1

UNLESS OTHERWISE SPECIFIED,

INTERPRET THIS DRAWING PER ANSI/IPC.

ALL RESISTOR VALUES ARE IN OHMS.

REVISIONS			
REV	DESCRIPTION	DRC BY	APVD/DATE
P2	NOT RELEASED	ESS 2-27-96	
A	30491	ESS 3-12-96	3-12-96
B	30823	5-15-96	5-17-96
C	31031	ECO 5-24-96	6-25-96
D	ECN 31372	8-02-96	8-8-96
E	ECN 31887	12-17-96	12-18-96

PDET1 (PROBE DET 1)

A3J5-1, A3J5-2, A3J5-3, A3J5-4

R38 1.00K 1/8W, 1%; R48 1.00K 1/8W, 1%; R4 10K 1/8W, 1%; R49 20K 1/8W, 1%; CR9 1N4148; R37 1.00K 1/8W, 1%; R50 20K 1/8W, 1%; R15 10K 1/8W, 1%; U1 LM393H; R13 1.00K 1/8W, 1%; R14 1M 1/8W, 1%; OUT1 TP3; 15-A3J6 OUT_P1

PDET2 (PROBE DET 2)

A3J7-1, A3J7-2, A3J7-3, A3J7-4

R45 1.00K 1/8W, 1%; R42 1.00K 1/8W, 1%; R1 10K 1/8W, 1%; CR10 1N4148; R41 1.00K 1/8W, 1%; R51 20K 1/8W, 1%; R16 10K 1/8W, 1%; U1 LM393H; R18 1.00K 1/8W, 1%; R17 1M 1/8W, 1%; OUT2 TP4; 14-A3J6 OUT_P2

AIMING BEAM

A3J4-6 RED, A3J4-5 BLK, A3J4-4 GRN, A3J4-3 BLU, A3J4-2 NC, A3J4-1

Q4 IRF640; R11 10K 1/8W, 1%; AIM_BD TP1; 17-A3J6 AIM_BP; CR2 5.1V, .5W; C7 .100uF 50V; Q1 2N3904; R5 10K 1/8W, 1%; 16-A3J6 AIM_BO; R6 10K 1/8W, 1%; R7 10K 1/8W, 1%

AIM_OD TP2; R10 1.00K 1/8W, 1%; U2 LM393H; 18-A3J6 AIM_OD; VREF; R8 10K 1/8W, 1%; R9 1M 1/8W, 1%

C3 (CELL 3)

A3J3-1, A3J3-2, A3J3-3, A3J3-4

C22 100pF 200V; R40 475K 1/8W, 1%; U7 OP07; R39 475 1/8W, 1%; C18 100pF 200V; R36 1.13K 1/8W, 1%; U5 OP07; R25 10K 1/8W, 1%; U4 LM393H; R27 1.00K 1/8W, 1%; C3AMP TP11; C3_DET TP6; GND TP7; 21-A3J6 C3_DET; 20-A3J5 AGND; R26 1M 1/8W, 1%

STPOS (SHUTTER POS)

A3J1-1, A3J1-2, A3J1-3, A3J1-4

R46 1.00K 1/8W, 1%; R28 10K 1/8W, 1%; R47 1.00K 1/8W, 1%; C9 .100uF 50V; R29 10K 1/8W, 1%; U4 LM393H; R31 1.00K 1/8W, 1%; R30 1M 1/8W, 1%; ST_POS TP8; 22-A3J6 ST_POS

A3J6-25 SPKR2, A3J6-26 SPKR1; A3J8-1, A3J8-2 SPKR

SPARES

U2 LM393H; U3 LM393H; 19-A3J6; U7_4 (2)

REFERENCE DESIGNATORS	
LAST USED	NOT USED
C24	C3, C4
CR10	
A3J9	
Q6	
R51	R12
LED3	
U7	
TP11	

542-1044-501 WHERE USED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: .XX ±.03, .XXX ±.010, ANGLE ±1°

MATERIAL:

FINISH:

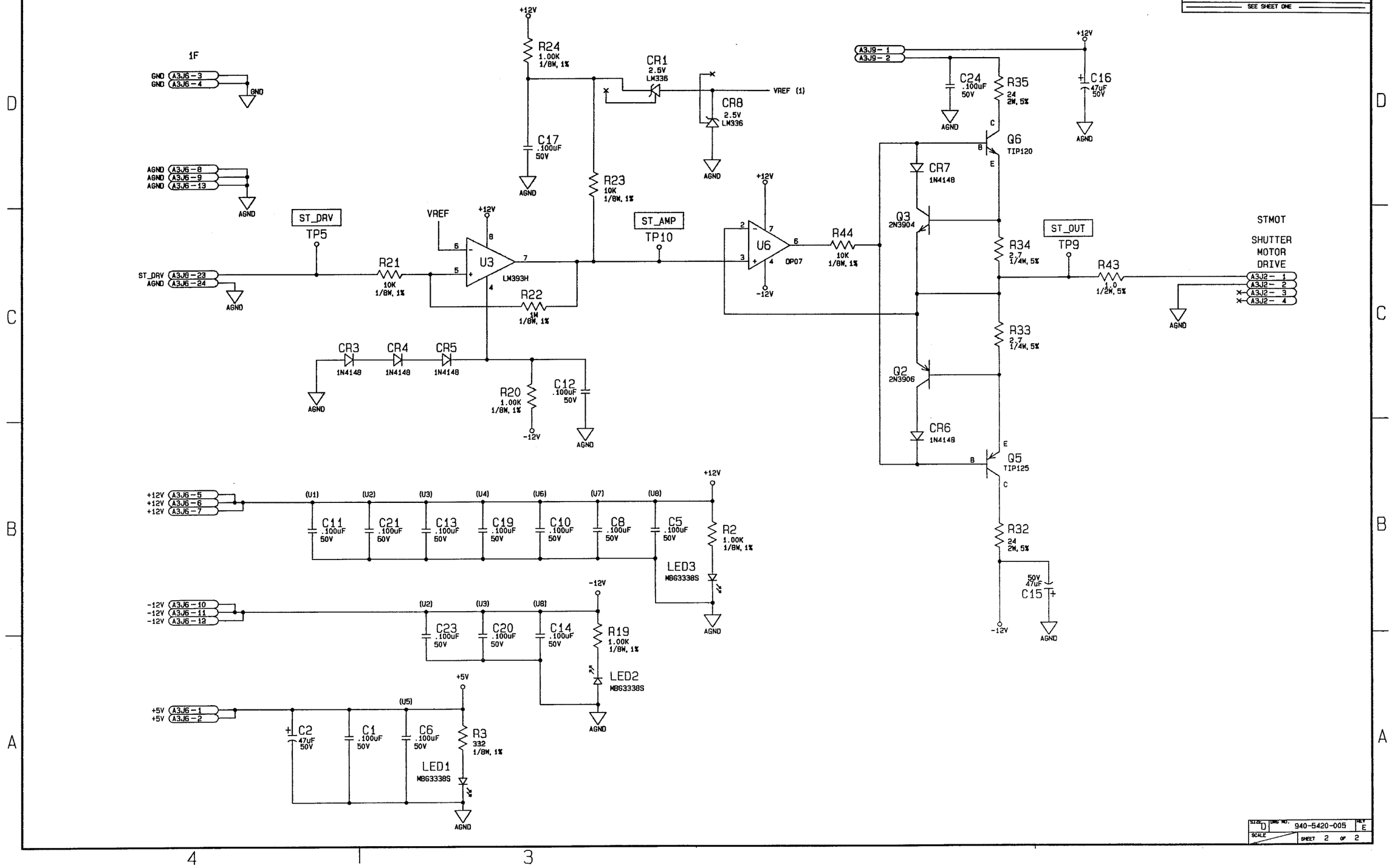
SURFACE ROUGHNESS

DRAWN BY	E.STEDMAN	2-8-96
DESIGNER	ESS	2-8-96
CHECKED	SC Bill	3-5-96
APPROVED	JW	2-15-96

Alcon SURGICAL, Irvine, California 92715

TITLE: SCHEMATIC, OPTICS PCB

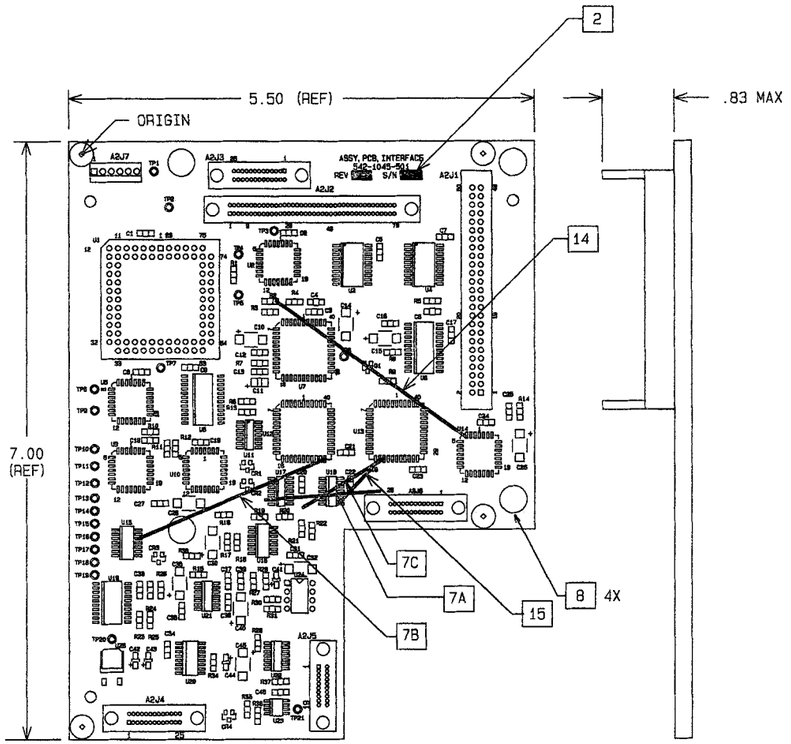
SIZE D; DWG NO. 940-5420-005; REV E; SCALE; SHEET 1 OF 2


REVISIONS
SEE SHEET ONE
1F
GND A3J6-3
GND A3J6-4
AGND A3J6-8
AGND A3J6-9
AGND A3J6-13
ST_DRV A3J6-23
AGND A3J6-24
+12V A3J6-5
+12V A3J6-6
+12V A3J6-7
-12V A3J6-10
-12V A3J6-11
-12V A3J6-12
+5V A3J6-1
+5V A3J6-2
A3J9-1
A3J9-2
ST_DRV
TP5
ST_AMP
TP10
ST_OUT
TP9
VREF
VREF (1)
R24 1.00K 1/8W, 1%
R23 10K 1/8W, 1%
R21 10K 1/8W, 1%
R22 1M 1/8W, 1%
R20 1.00K 1/8W, 1%
R44 10K 1/8W, 1%
R35 24 2W, 5%
R34 2.7 1/4W, 5%
R33 2.7 1/4W, 5%
R32 24 2W, 5%
R43 1.0 1/2W, 5%
R2 1.00K 1/8W, 1%
R19 1.00K 1/8W, 1%
R3 332 1/8W, 1%
C17 .100uF 50V
C24 .100uF 50V
C16 47uF 50V
C12 .100uF 50V
C11 .100uF 50V
C21 .100uF 50V
C13 .100uF 50V
C19 .100uF 50V
C10 .100uF 50V
C8 .100uF 50V
C5 .100uF 50V
C23 .100uF 50V
C20 .100uF 50V
C14 .100uF 50V
C2 47uF 50V
C1 .100uF 50V
C6 .100uF 50V
C15 47uF 50V
CR1 2.5V LM336
CR8 2.5V LM336
CR3 1N4148
CR4 1N4148
CR5 1N4148
CR7 1N4148
CR6 1N4148
LED3 MBG3338S
LED2 MBG3338S
LED1 MBG3338S
U3 LM393H
U6 OP07
Q6 TIP120
Q3 2N3904
Q2 2N3906
Q5 TIP125
STMOT
SHUTTER
MOTOR
DRIVE
A3J2-1
A3J2-2
A3J2-3
A3J2-4
AGND
+12V
-12V
+5V
VREF
(U1)
(U2)
(U3)
(U4)
(U5)
(U6)
(U7)
(U8)
SIZE D
DWG NO. 940-5420-005
REV E
SCALE
SHEET 2 OF 2

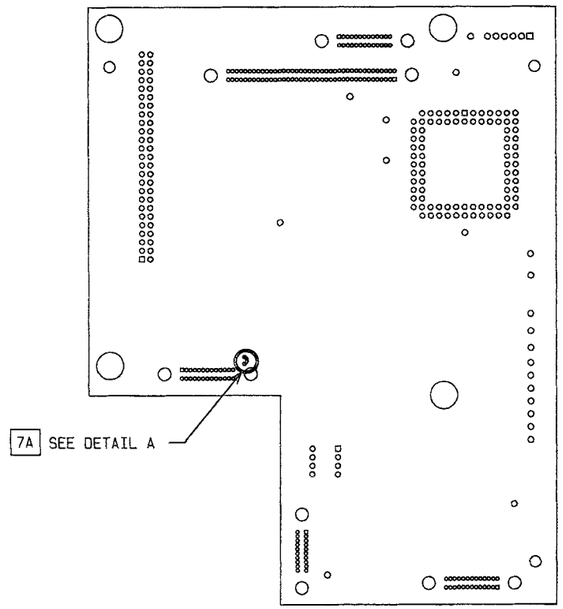
NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING PER ANSI/IPC-D-326.
2. PERMANENTLY MARK THE SERIAL NUMBER AND ASSEMBLY REVISION LETTER ON PCB, APPROXIMATLEY WHERE SHOWN.
3. REFERENCE SCHEMATIC 940-5420-004 & 941-5420-004.
4. ASSEMBLE PER ALCON WORKMANSHIP STANDARDS WHERE APPLICABLE.
5. DETAILS ON ASSEMBLY DRAWING TAKE PRECEDENCE OVER WORKMANSHIP STANDARDS.
6. NOT INSTALLED: R18, R22, U25.
7. REWORK REV A FAB ONLY AS FOLLOWS:
   - A. CUT TRACE AND ROUTE INSULATED JUMPER (P/N: 036-009) THROUGH VIA HOLE COMMON TO U14-16. SOLDER JUMPER, ON SECONDARY SIDE, TO VIA CONNECTING TO A2J6-21. SOLDER JUMPER ON PRIMARY SIDE TO VIA AT U17-6.
   - B. INSTALL JUMPER, ITEM 341, BETWEEN LEAD ON U15-12 AND LEAD ON U12-28.
   - C. INSTALL JUMPER, ITEM 341, BETWEEN VIA AT U17-5 AND LEAD ON U13-20.
   - D. SECURE JUMPER TO PCB USING ADHESIVE, ITEM 342.
8. SOLDER MASK 4 MOUNTING HOLES.
9. SOLDER MASK VIA HOLE. SEE DETAIL A
10. TEST PER MTP 907-5420-007.
11. REF. S/W SPEC., 996-5420-004.
12. REF. FIX. SPEC., 995-5420-009.
13. REF. MOP, 992-0000-047.
14. REWORK INSTRUCTIONS:
    - A. CUT TRACE CONNECTING A2J1-30 TO U14-4 NEAR A2J1-30.
    - B. INSTALL JUMPER, ITEM 341, BETWEEN COMMON NODE OF R2, R3, AND U7-6 AND TRACE COMMON TO U14-4.
    - C. SECURE JUMPER TO PCB USING ADHESIVE, ITEM 342.
15. A. INSTALL JUMPER, ITEM 341, BETWEEN U13-19 AND U18-9.
    B. SECURE JUMPER TO PCB USING ADHESIVE, ITEM 342.

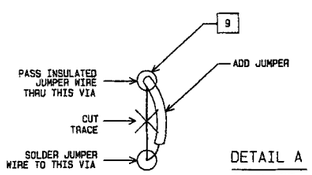
REVISIONS			
REV	ECN	INC BY	APVD/DATE
P1	NOT RELEASED	4-5-96	
A	30647	4-11-96	4-12-96
B	30802	5-10-96	5-10-96
C	31049	5-27-96	6-28-96
D	31154	7-22-96	7-24-96
E	31682	10-29-96	10-31-96
F	31755	11-19-96	11-21-96
G	32034	2-6-97	2-6-97
H	32057	2-6-97	2-6-97
J	34073	6-23-98	6-24-98
K	34094	6-29-98	6-29-98
L	98200294	11-2-98	11-4-98
N	99200867	5-21-99	5-22-99
N	20003066	11-9-00	11-13-00



PRIMARY SIDE



SECONDARY SIDE



DETAIL A
SCALE: NONE

SEE SEPARATE PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: XX ±.03, XXX ±.010, ANGLE ±1°	THIS DOCUMENTATION CONTAINS PROPRIETARY INFORMATION WHICH SHALL NOT BE REPRODUCED OR TRANSFERRED TO OTHER DOCUMENTS OR DISCLOSED TO OTHERS OR USED FOR MANUFACTURING OR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION OF ALCON SURGICAL.	
WHERE USED	DRAWN	DATE 4-1-98
MATERIAL	DESIGNER	4-1-98
FINISH	CHECKED	4-4-98
ASSEMBLY NUMBER	APPROVED S.POLSKI	4-2-98
	SURFACE ROUGHNESS	
	Alcon SURGICAL IRVINE, CALIFORNIA 92718	
	TITLE: ASSY, PCB, INTERFACE	
	SIZE D · DRAWING NO. 542-1045-501 · REV N	
	SCALE NONE · SHEET 1 OF 1	

NOTES: UNLESS OTHERWISE SPECIFIED.
1. INTERPRET THIS DRAWING PER ANSI/IPC.
2. ALL RESISTOR VALUES ARE IN OHMS.
3. INSTALL R17 & R21 ONLY OR R18 & R22 ONLY. DO NOT INSTALL R17 & R21 WHEN ADJUSTMENT NOT REQUIRED. DO NOT INSTALL R18 & R22 WHEN ADJUSTMENT IS REQUIRED.
4. NOT INSTALLED: U25.
5. U7-6 IS JUMPERED TO U14-4. A2J1-30 IS AN OPEN PIN (NOT CONNECTED)
6. U13-19 IS JUMPERED TO U18-9.

REVISIONS			
REV	DESCRIPTION	INC BY	APVD/DATE
P4	NOT RELEASED	LC 4-5-96	
A	30647	4-11-96	4-12-96
B	31049	MW 6-26-96	7-1-96
C	31662	ECS 10-29-96	10-31-96
D	32034	2-5-97	2-5-97
E	32057	2-5-97	2-5-97
F	99200867	9-23-98	LC 9-22-99

TO CPU

3MB1080-660303

TO CPU

3MB1026-660303

TO BP

3MB1026-660303

TO FP

3MB1020-660303

TO BP

AMP640456-6

TO ANALOG

3MB1026-660303

TO OPTICS

3MB1026-660303

U1 — AMP822150-1, HPT84

U3, U4 — 74HCT245D

U6 — YM3812-F

U7 — MAX180BCQH

U8 — MAX526DCWG

U9 — AD7225KP

U10 — AD7228ABP

U12, U13 — CS82C55A

U14 — MX7828KP

U23 — X24C02S8

U19 — X9241US

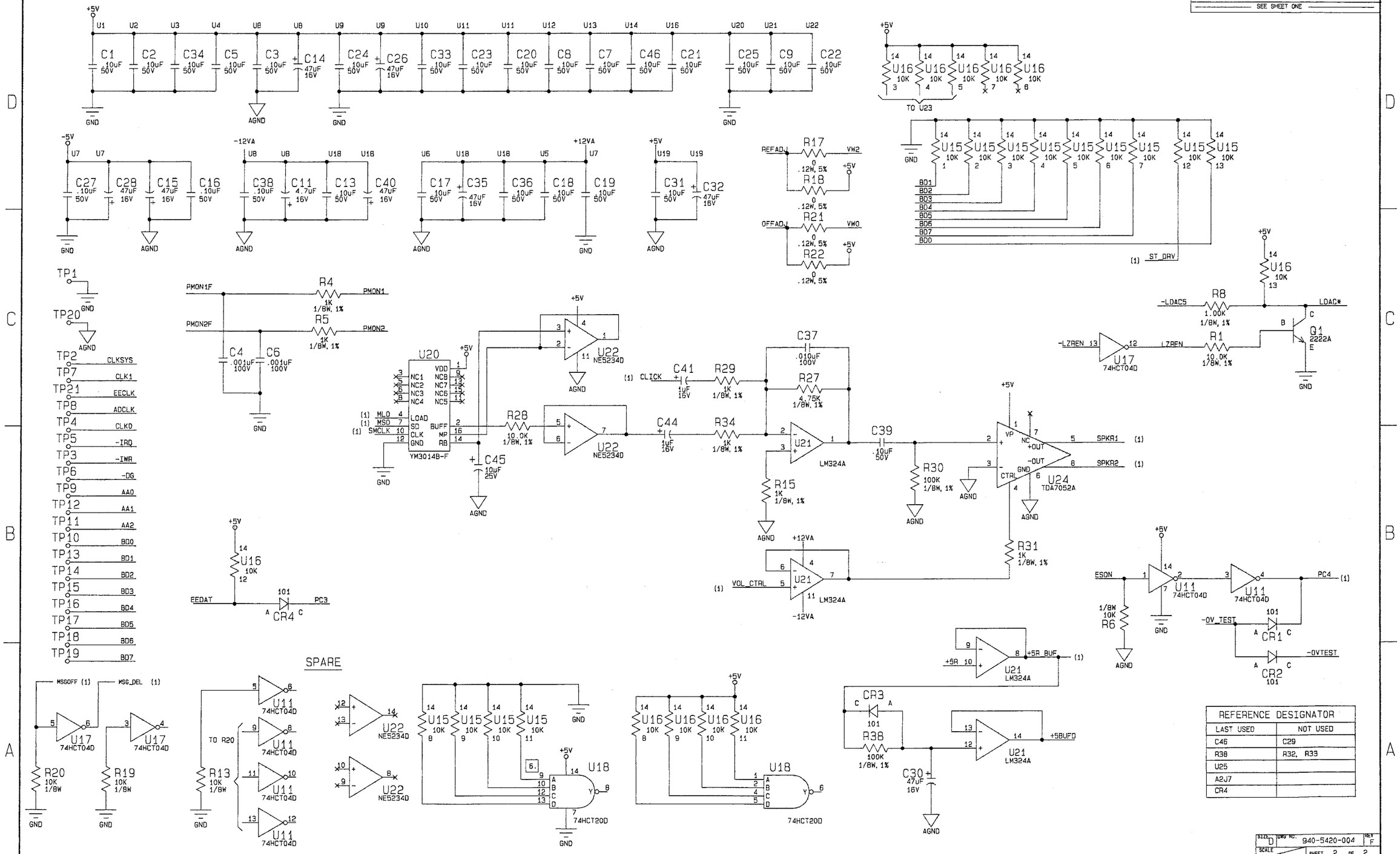
U5 — CS82C54-10

U2 — CS82C59A

U17 — 74HCT04D

U25 — MC78M05CDT

542-1045-501 WHERE USED	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: .XX ±.03 .XXX ±.010 ANGLE ±1°	THIS DOCUMENTATION CONTAINS PROPRIETARY INFORMATION WHICH SHALL NOT BE REPRODUCED OR TRANSFERRED TO OTHER DOCUMENTS OR DISCLOSED TO OTHERS OR USED FOR MANUFACTURING OR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION OF ALCON SURGICAL.	
MATERIAL:		DRAWN BY S. POLSKI	DATE 7-25-95
FINISH:		DESIGNER	7-25-95
		CHECKED	4-4-96
		APPROVED S. POLSKI	3-26-96
		SURFACE ROUGHNESS	
		Alcon SURGICAL Irvine, California 92718	
		TITLE: SCHEMATIC, PCB, INTERFACE	
		SIZE D DWG NO. 940-5420-004	REV F
		SCALE	SHEET 1 OF 2


REVISIONS
SEE SHEET ONE
+5V
GND
AGND
-5V
+12VA
-12VA
C1 .10uF 50V
C2 .10uF 50V
C34 .10uF 50V
C5 .10uF 50V
C3 .10uF 50V
C14 47uF 16V
C24 .10uF 50V
C26 47uF 16V
C33 .10uF 50V
C23 .10uF 50V
C20 .10uF 50V
C8 .10uF 50V
C7 .10uF 50V
C46 .10uF 50V
C21 .10uF 50V
C25 .10uF 50V
C9 .10uF 50V
C22 .10uF 50V
C27 .10uF 50V
C28 47uF 16V
C15 47uF 16V
C16 .10uF 50V
C38 .10uF 50V
C11 4.7uF 16V
C13 .10uF 50V
C40 47uF 16V
C17 .10uF 50V
C35 47uF 16V
C36 .10uF 50V
C18 .10uF 50V
C19 .10uF 50V
C31 .10uF 50V
C32 47uF 16V
R17 0 .12W, 5%
R18 0 .12W, 5%
R21 0 .12W, 5%
R22 0 .12W, 5%
REFAD
OFFAD
VW2
VW0
U16 10K
TO U23
U15 10K
BD1
BD2
BD3
BD4
BD5
BD6
BD7
BD0
(1) ST_DRV
TP1
TP20
TP2 CLKSYS
TP7 CLK1
TP21 EECLK
TP8 ADCLK
TP4 CLKO
TP5 -IRQ
TP3 -IWR
TP6 -DG
TP9 AA0
TP12 AA1
TP11 AA2
TP10 BD0
TP13 BD1
TP14 BD2
TP15 BD3
TP16 BD4
TP17 BD5
TP18 BD6
TP19 BD7
PMON1F
PMON2F
R4 1K 1/8W, 1%
R5 1K 1/8W, 1%
PMON1
PMON2
C4 .001uF 100V
C6 .001uF 100V
U20 YM3014B-F
(1) MLO
(1) MSO
(1) SMCLK
LOAD
BUFF
U22 NE5234D
R28 10.0K 1/8W, 1%
C45 10uF 25V
C44 1uF 16V
R34 1K 1/8W, 1%
C41 1uF 16V
R29 1K 1/8W, 1%
C37 .010uF 100V
R27 4.75K 1/8W, 1%
(1) CLICK
U21 LM324A
C39 .10uF 50V
R30 100K 1/8W, 1%
R15 1K 1/8W, 1%
R31 1K 1/8W, 1%
VOL_CTRL
U24 TDA7052A
SPKR1
SPKR2
-LDAC5
R8 1.00K 1/8W, 1%
LDAC*
Q1 2222A
-LZREN 13
LZREN
R1 10.0K 1/8W, 1%
U17 74HCT04D
EEDAT
PC3
CR4
ESON
R6 1/8W 10K
U11 74HCT04D
PC4
-OV_TEST
CR1
CR2
-OVTEST
+5R 10
+5R_BUF
+5BUFD
CR3
R38 100K 1/8W, 1%
C30 47UF 16V
SPARE
MSGOFF (1)
MSG_DEL (1)
R20 10K 1/8W
R19 10K 1/8W
R13 10K 1/8W
TO R20
U18 74HCT20D
REFERENCE DESIGNATOR
LAST USED
NOT USED
C46
C29
R38
R32, R33
U25
A2J7
CR4
SIZE D
DWG NO. 940-5420-004
REV F
SCALE
SHEET 2 OF 2

REVISIONS			
SYM	ECO	INC BY	APVD/DATE
P1	NOT RELEASED	MMCD	
A	20012416	MMCD	L.CHU 4-24-01
B	20012557	MMCD	JFW 5-29-01
C	20012607	LCHU	JFW 6-8-01
D	20012771	MMCD	7-24-01

NOTES: UNLESS OTHERWISE SPECIFIED.

SECTION A/ GENERAL INFORMATION:

1. INTERPRET THIS DRAWING PER ANSI/IPC-D-326.
4. ASSEMBLE PER ALCON WORKMANSHIP STANDARDS.
5. DETAILS ON ASSEMBLY DRAWING TAKE PRECEDENCE OVER WORKMANSHIP STANDARDS.

SECTION B/ SMT:

2. PERMANENTLY MARK THE SERIAL NUMBER AND LATEST REVISION LETTER ON PCB.

SECTION C/ BOARD & COMPONENT PREP:

15. SOLDERMASK BOARD AT LOCATIONS ON SECONDARY SIDE:
Q4, Q5, Q6, TH1, Q7, Q8, Q9, Q10, Q11, Q12, HTSK1, HTSK2, S1, S2, P1, P2,P3, P4, P5, P6, P7, P8, PTC1, 2X GRN, 2X BLK, AND 8 MOUNTING HOLES.

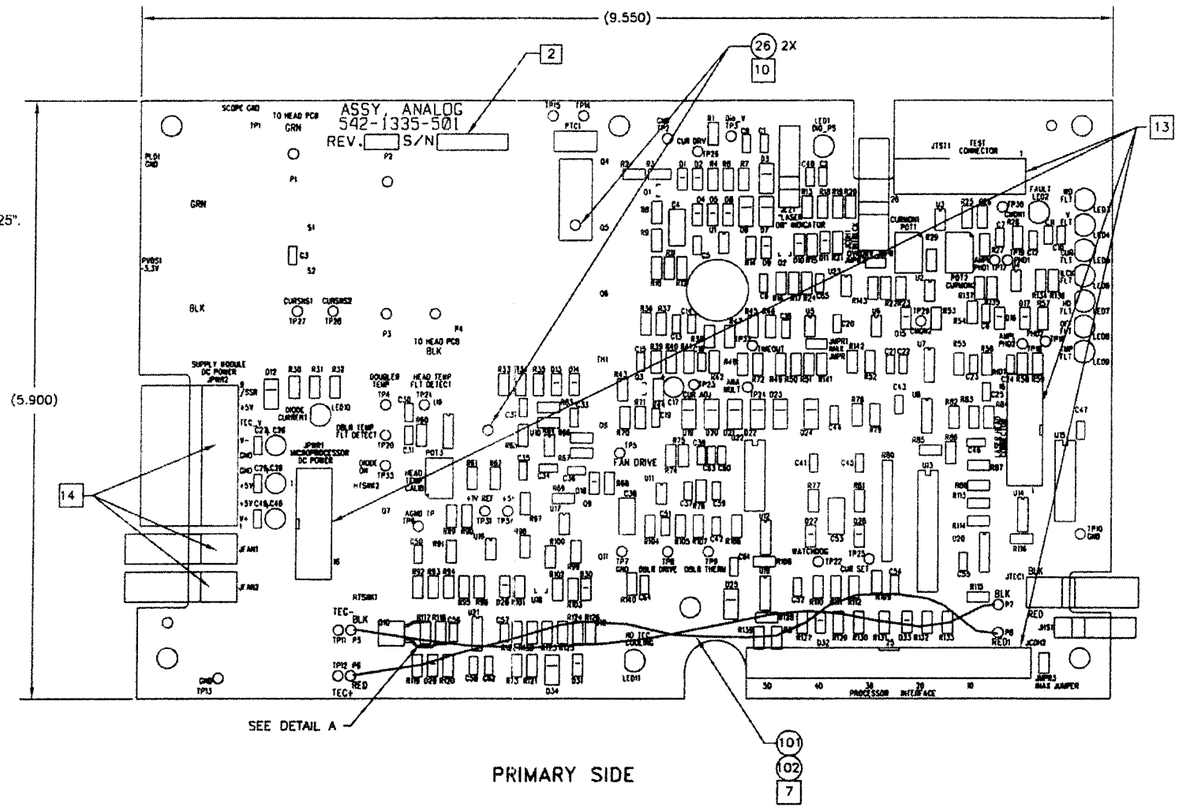
SECTION D/ ROYONIC:

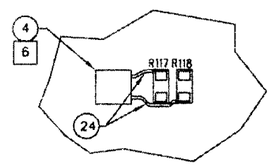
13. LEAD PROTRUSION, LESS THAN .020" AT JCDH2, JTST1, JHD1, AND JPWR1 ARE ACCEPTABLE PER IPC-A-610.
14. USE MASKING TAPE TO HOLD CONNECTORS AT JPWR2, JFAN1, AND JFAN2 DURING WAVE SOLDER PROCESS.

SECTION E/ FINAL ASSY:

6. INSTALL .1MFD CAPACITOR (ITEM 4) AND TEFLON TUBING (ITEM 24) AS SHOWN IN DETAIL A.
7. SOLDER THE TEC WIRES:
CUT THE RED WIRE (ITEM 101) AND BLACK WIRE (ITEM 102) TO LENGTH 7.25" ± .25".
TWIST TWO WIRES INTO A CABLE MINIMUM OF THREE TURNS.
STRIP AND SOLDER ENDS OF RED WIRE INTO PCB AT P6 AND P8.
STRIP AND SOLDER ENDS OF BLACK WIRE INTO PCB AT P5 AND P7.
8. INSTALL PEM NUTS: (SEE DETAIL B)
USE PEM NUT TOOL# AA-170 WITH M4 HEAD # AA271-470 TO INSTALL SIX M4 PEM NUTS (ITEM 27) THRU PCB HOLES PLD1 (2X) PVDS1 (2X), P1 AND P4 AS FOLLOWS.
VERIFY THAT THE PEMS ARE FLUSH WITH THE SOLDER SURFACE OF THE PCB.
INSERT THE THREADED TIP OF CRIMP TOOL THROUGH THE COMPONENT SIDE OF THE PCB.
THREAD ONE PEM NUT ONTO THE CRIMPER TIP (TO THE END OF THE THREADS) WITH PEM FLANGE FACING THE SOLDER SIDE OF THE PCB.
THE PEM, PCB, AND HEAD OF THE CRIMPER SHOULD BE PARALLEL TO EACH OTHER. SLOWLY SQUEEZE THE CRIMPER HANDLES TOGETHER AND VERIFY THE FLANGE OF THE CRIMPER SITS COMPLETELY INSIDE THE PCB THRU HOLE.
PULL THE CRIMPER HANDLES TOGETHER TO COMPLETE THE CRIMP.
9. ASSEMBLE HEATSINK AND HARDWARE: (SEE DETAIL C)
USE YOUR FINGERS TO INSERT TWO CUP SETSCREWS (ITEM 29) INTO TOP SURFACE OF HEATSINK (ITEM 2) UNTIL THE CENTER SCREW HITS THE TOP SURFACE OF THE NEXT FIN ON THE HEATSINK AND THE CORNER SCREW IS THE SAME LEVEL AS THE CENTER SCREW.
USE YOUR FINGERS TO TIGHTEN TWO NUTS (ITEM 26) ON TO BOTH SETSCREWS.
10. INSTALL THE HEATSINK (WITH ATTACHED HARDWARE) INTO THE PCB.
PLACE THE HEATSINK (WITH ATTACHED HARDWARE) INTO THE PCB ON SECONDARY SIDE WITH FINS FACING Q7, USE TWO NUTS (ITEM 26) TO SECURE HEATSINK TO PCB.

(CONTINUED ON SHT 2)





DETAIL A

SEE SEPARATE PARTS LIST

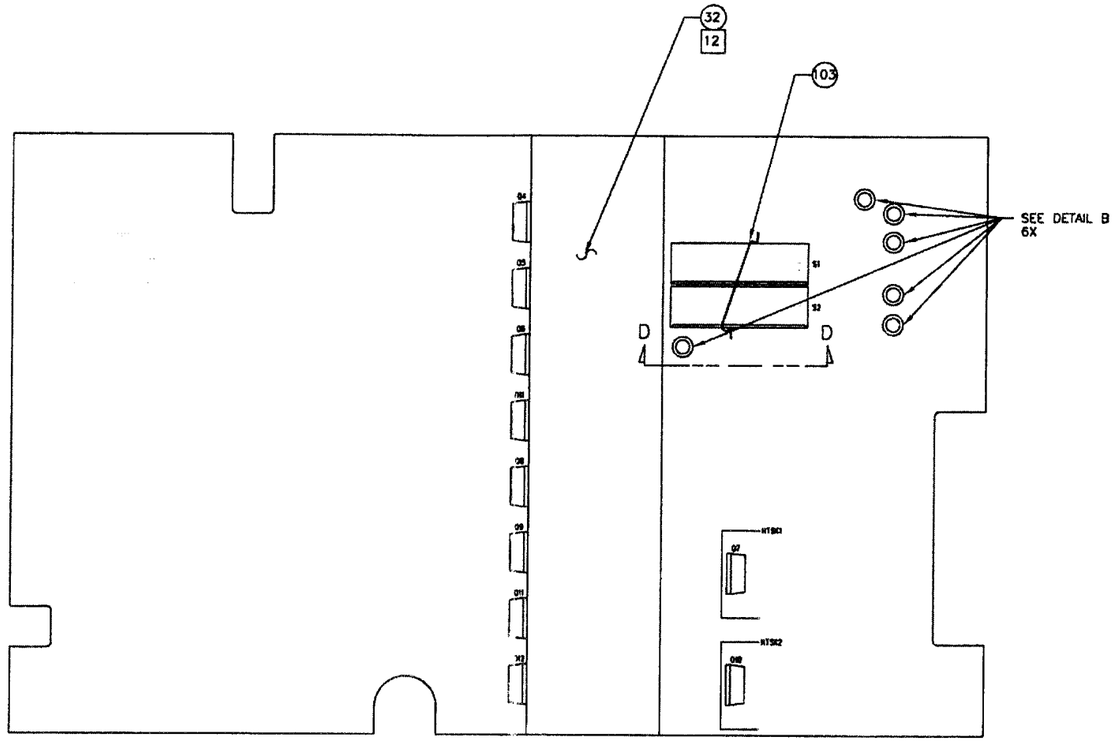
NEXT ASSY.		BY MMCD	DATE 2-14-01
MATERIAL:		DRAWER MMCD	2-14-01
FINISH:		CHECKED JFW	2-13-01
		APPROVED S.AMBROSE	2-27-01

Alcon LABORATORIES IRVINE, CALIFORNIA 92606

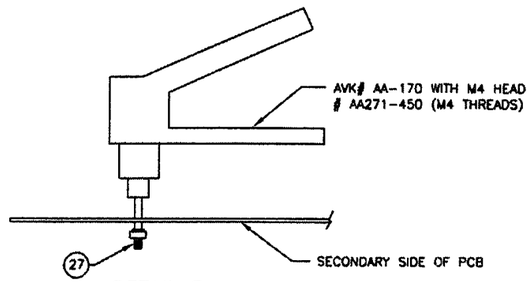
TITLE: ASSY, PCB, ANALOG

SIZE D | DWG NO. 542-1335-501 | REV. D

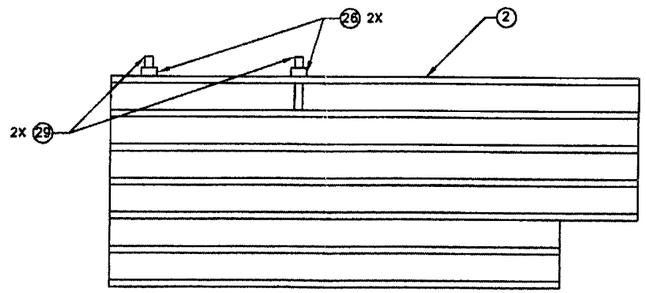
SCALE NONE | SHEET 1 OF 2



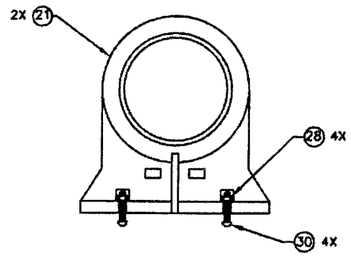
SECONDARY SIDE



DETAIL B
INSTALL PEM NUT



DETAIL C
ASSEMBLE HEATSINK WITH HARDWARE



VIEW D-D

SIZE	DRWG NO	REV
D	542-1335-501	B
SCALE NONE	SHEET 2 OF 2	

542-1335-501 REV B

REVISIONS		
REV.	ECN	DATE
P2	NOT RELEASED	——
A	20012416	4-24-01
B	20012557	5-25-01

TO MICROPROCESSOR JCDH2

ENABLE*, RESET, ENABLE, DIO_CUR, LITE_LOOP*, REF_LVL, PMON1, IR/GRN, WD, IR_LAT, FAULT*, FLT_0, FLT_1, FLT_2, +5R, CUR_MON1, CUR_MON2, H_TEMP, PMON2, HS_TEMP, VDS_SNS, OC_TEST*, OV_TEST*, FD_BAK, FAN_IN, EECLK, EEDAT, SSR_MON*, WIDE_IMAX_RANGE*, OVR_DRV*

TEST CONNECTOR JTST1

DB_TEST, HT_TEST, CUR_MON1, FD_BAK, MID_V, DBTMP_S, +5V, DIO_V, FAN_OUT, DB_HEAT, DB_ACTL, MAX*, HF_TEST, TEC+, TEC-, TEC_V

To Fans

TO LEFT FAN — JFAN1 — V+

TO RIGHT FAN — JFAN2 — FAN_OUT

TO TEC JTEC1: TEC-, TEC+

Laser On Indicator

JLZ1

MID_V, DIG_ON → U9B LM339D

Reference

V+ → R100 332 → TP34 → +5R

U18 LM4040

TP6 — R128 0

U6B OP-282

U11A OP-282: V+, C18 .10MF, C20 .10MF, V-

TO LASER HEAD JHD1

MAX*, +5R, HTMP_SET, HTEMP_S, DBTMP_SET, DBTMP_S, DB_HEAT, V+, EECLK, EEDAT, +5V

TP19, TP18, TP17

R135 383K → PMON1_BUF

U4A OP-297: C12 .10MF, C8 .10MF, R54 2.00K → PMON1, C11 .10MF, D16 6.8V

U4B OP-297: R57 2.00K → PMON2, R134 383K, C10 .10MF, D17 6.8V

R137 49.9K, R136 49.9K, TP16

INTERLOCK JCDH1 — R13 100 — ILOCK

R18 1.00K, C2 .010MF

Doubler Temp Fault

V+ — R138 2.00K — R73 N/U, C82 .10MF

TP20

+5R — R33 10.0K

U21D LM339D → TMP_FLT*

TP4 — DB_ACTL — R35 1.00K — R34 2.00K — C32 .10MF

U9D LM339D

Doubler Temp Control

+5R — R107 6.19K, R103 10.0K, R69 22.1K, R102 9.09K

TP9 — DBTMP_S

U17 AD620

R105 30.1K

U11B OP-282: C51 100PF, R104 3.32M, C38 1.0, TP8 → DB_HEAT

R68 1M, Q9 IRF510, D18 N/U, TEC_V

C37 100PF

DBTMP_SET — R76 1.00K — DB_TEST

FAN SPEED CONTROL

+5R — R74 2.00K — R67 25.5K — D13 RLS4148 — TP5 — FAN_OUT

D14 CLL5225B

FAN_IN — R127 10.0K

U10B OP-282: R66 1M → Q8 IRF510

C33 .10MF

R75 4.99K

TO PROCESSOR PCB JPWR1: +5V, V+, V-

FROM PS JPWR2: V+, +5V, V-, TEC_V, +5V, SSR*

C29 .10MF, C28 6.8, C49 .10MF, C48 6.8, C27 .10MF, C26 6.8, C50 .10MF

4. CAPACITOR CA IS JUMPERED FROM R117 (TOP END) TO R118 (BOTTOM END).

3. THE FOLLOWING COMPONENTS ARE NOT INSTALLED: C13, C16, C65, D18, JPR1, JPR2, JPR3, R40, R42, R73, R142, R143, U23.

2. ALL RESISTOR VALUES ARE IN OHMS.

1. INTERPRET THIS DRAWING PER ANSI/IPC-D-326.

NOTES: UNLESS OTHERWISE SPECIFIED.

542-1335-501

NEXT ASSEMBLY

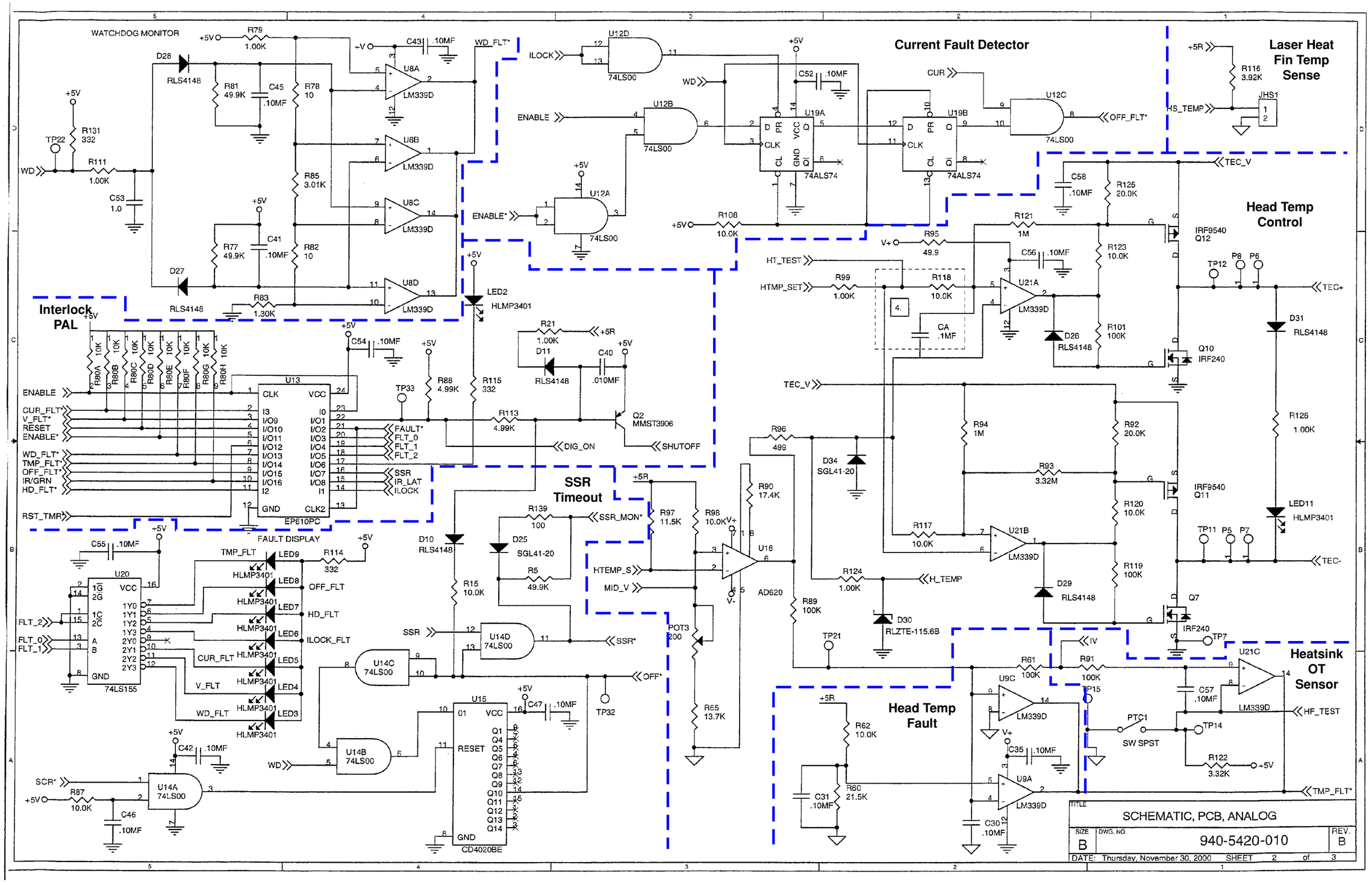
DRAWN	MMcD	11-29-00
DESIGNER	MMcD	11-29-00
CHECKED	JFW	2-27-01
APPROVED	S.Ambrose	2-27-01

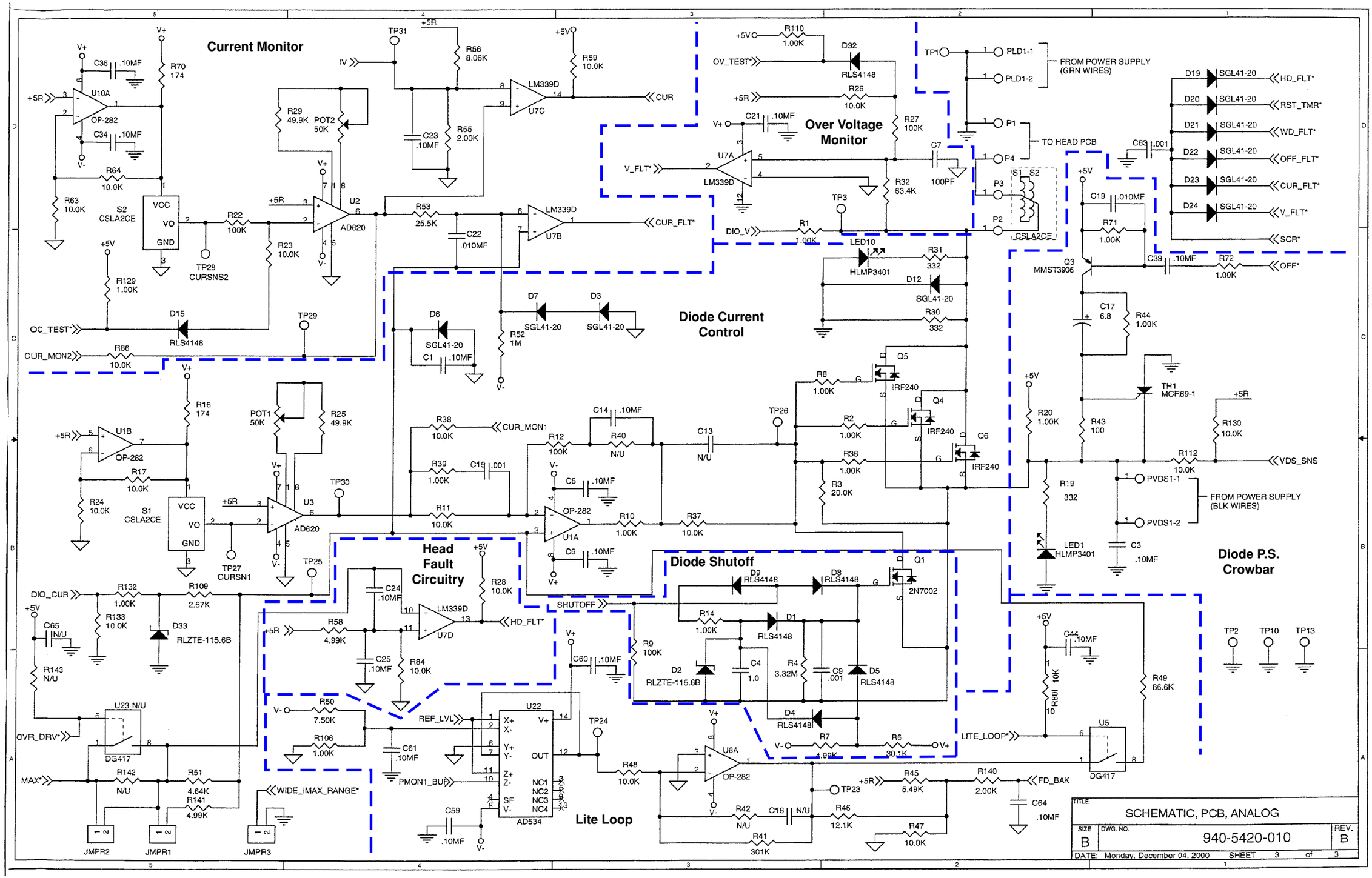
Alcon LABORATORIES IRVINE, CA. 92618

TITLE: SCHEMATIC, PCB, ANALOG

SIZE B | DWG. NO. 940-5420-010 | REV. B

DATE: Wednesday, November 29, 2000 SHEET 1 of 3


WATCHDOG MONITOR
Current Fault Detector
Laser Heat Fin Temp Sense
Head Temp Control
Interlock PAL
SSR Timeout
FAULT DISPLAY
Head Temp Fault
Heatsink OT Sensor
SCHEMATIC, PCB, ANALOG
940-5420-010
DATE: Thursday, November 30, 2000 SHEET 2 of 3


Current Monitor
Over Voltage Monitor
Diode Current Control
Head Fault Circuitry
Diode Shutoff
Lite Loop
Diode P.S. Crowbar
FROM POWER SUPPLY (GRN WIRES)
TO HEAD PCB
FROM POWER SUPPLY (BLK WIRES)
SCHEMATIC, PCB, ANALOG
940-5420-010
Monday, December 04, 2000

NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING PER ANSI/IPC-D-326.
2. PERMANENTLY MARK THE SERIAL NUMBER AND LATEST REVISION LETTER ON PCB.
3. REFERENCE SCHEMATIC 940-5420-011.
4. ASSEMBLE PER ALCON WORKMANSHIP STANDARDS.
5. DETAILS ON ASSEMBLY DRAWING TAKE PRECEDENCE OVER WORKMANSHIP STANDARDS.
6. CUT 10 AWG BLACK WIRE (ITEM 21) TO 9.00" +/- .25" AND 10 AWG GREEN WIRE (ITEM 22) TO 11.50" +/- .25"

   STRIP INSULATION APPROX. .25" OF EACH END.

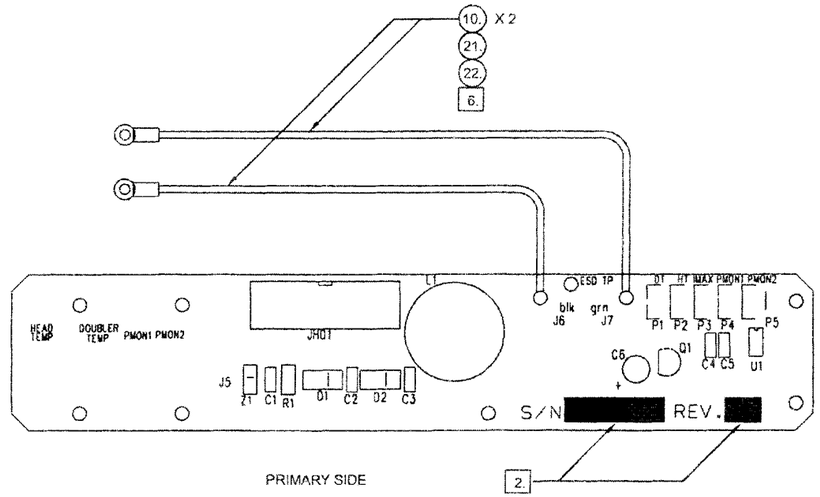
   CRIMP STRIPPED ENDS OF BLACK AND GREEN WIRE THRU RING LUG (ITEM 10) USING AMP TOOL #59824-1 OR EQUIVALENT.

   SLIDE OTHER END OF BLACK WIRE TO J6 FROM PRIMARY SIDE OF THE PCB, AND SOLDER BOTH SIDES OF THE PCB.

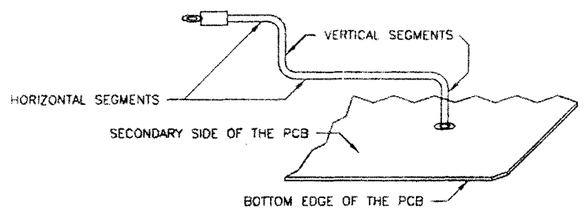
   SLIDE OTHER END OF GREEN WIRE TO J7 FROM PRIMARY SIDE OF THE PCB, AND SOLDER BOTH SIDES OF THE PCB.

   CUT EXCESS WIRES OFF THE SECONDARY SIDE OF THE PCB AS CLOSE TO FLUSH WITH THE SECONDARY SIDE PCB SURFACE AS POSSIBLE.
7. INSTALL CONNECTORS J1, J3, J4 (ITEM 6) AND J2 (ITEM 7) INTO THE SECONDARY SIDE OF THE PCB, WITH THE PLASTIC LOCKED CONNECTORS FACING TOWARD THE BOTTOM OF THE PCB.
8. INSTALL DIODE WIRE ASSY (ITEM 2) INTO POSITION J5 FROM SECONDARY SIDE OF PCB, SO THAT THE VERTICAL SEGMENTS OF THE ASSY ARE PERPENDICULAR TO THE PCB SURFACE AND THE HORIZONTAL SEGMENTS ARE PARALLEL WITH THE BOTTOM EDGE OF THE PCB. SOLDER THE WIRE ON BOTH SIDES OF THE PCB (SEE DETAIL A).

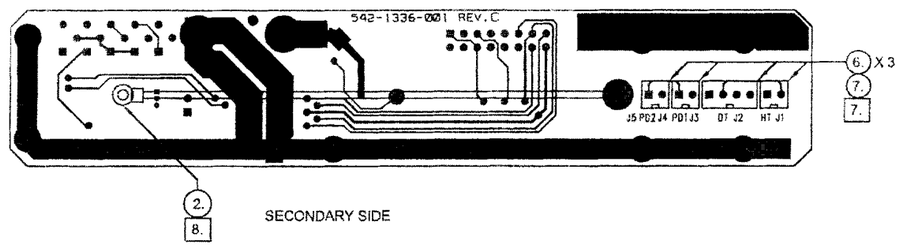
REVISIONS			
SYM	ECO	INC BY	APVD/DATE
P1	NOT RELEASED	MMCD	
A	20012261	MMCD	L.CHU 3-16-01
B	20012427	MMCD	JFW 4-20-01
C	20012711	SF	JFW 7-9-01



PRIMARY SIDE



DETAIL A



SECONDARY SIDE

SEE SEPARATE PARTS LIST

NEXT ASSY:	TOLERANCE UNLESS OTHERWISE SPECIFIED: .XX ±.03, .XXX ±.010, ANGLE ±1°	BY MMCD	DATE 2-20-01
MATERIAL:		DESIGNER MMCD	2-20-01
FINISH:		CHECKED JFW	2-22-01
		APPROVED S.AMBROSE	2-27-01

Alcon LABORATORIES IRVINE, CALIFORNIA 92618

TITLE: ASSY, PCB, HEAD

SIZE D | DWG NO 542-1336-501 | REV C

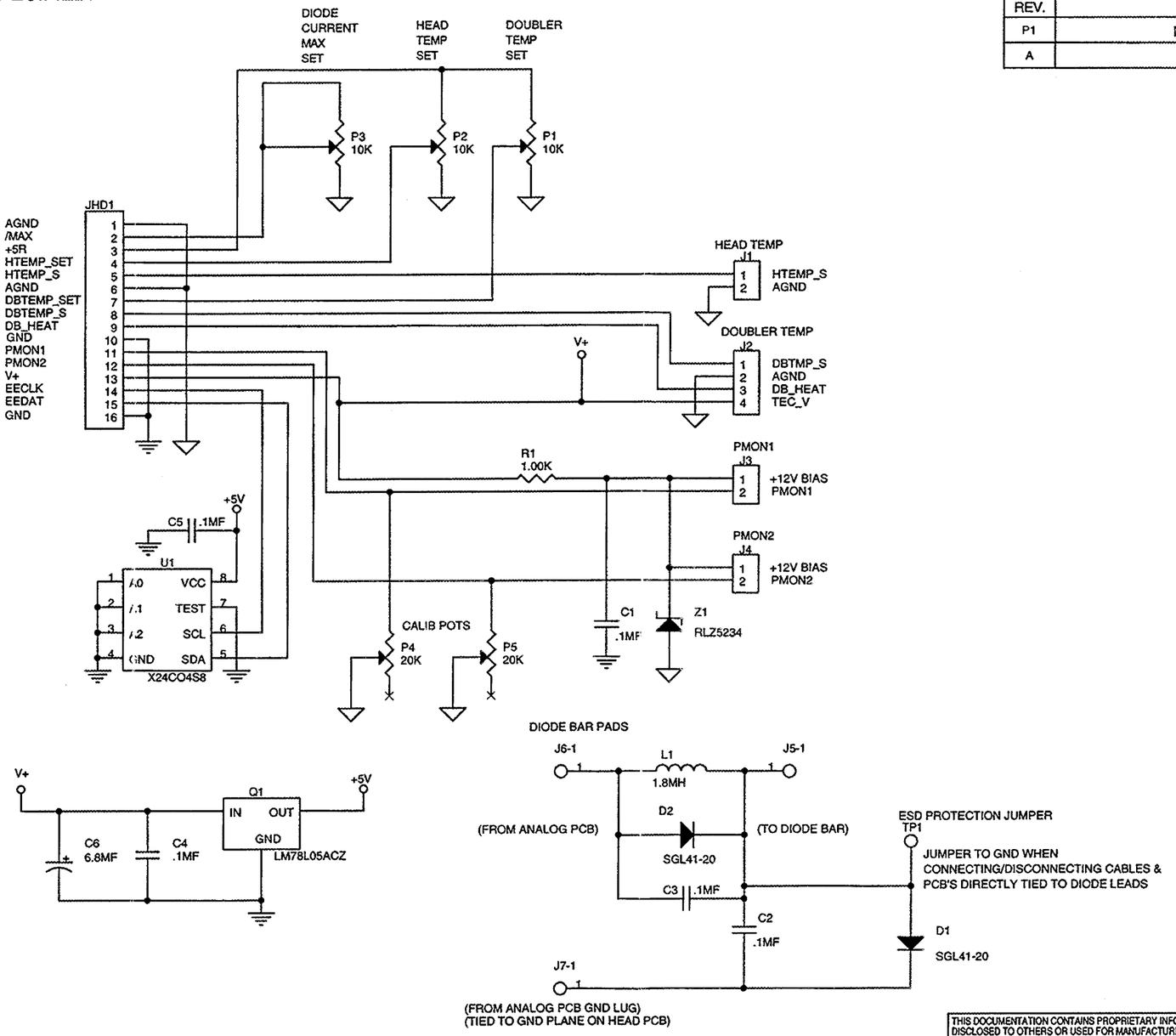
SCALE NONE | SHEET 1 > 1

DWG NO 542-1336-501 | REV C

NOTES: UNLESS OTHERWISE SPECIFIED.

1. INTERPRET THIS DRAWING PER ANSI/IPC-D-326.
2. ALL RESISTOR VALUES ARE IN OHMS.

REVISIONS			
REV.	DESCRIPTION	INC. BY	APPROVED
P1	NOT RELEASED	MMcD	
A	20012261	MMcD	2C3-16-01



542-1336-501 NEXT ASSEMBLY		Alcon LABORATORIES IRVINE, CA. 92618
DRAWN MMcD	DATE 12-14-00	TITLE SCHEMATIC, PCB, HEAD
DESIGNER MMcD	DATE 12-14-00	
CHECKED JFW	DATE 2-27-01	SIZE B / DWG. NO. 940-5420-011 / REV. A
APPROVED S.AMBROSE	DATE 2-27-01	DATE: Thursday, December 14, 2000 SHEET 1 of 1

SECTION SIX
PARTS LISTS AND DRAWINGS

CONTENTS

Table 6-1
System Parts List

ITEM	PART NUMBER	DESCRIPTION	COMMENT
1	542-1228-501	Computer, Single Board, 386EX	without Flash Memory Card
2	542-1105-504 542-1227-502	Flashcard for EyeLite¨ Flashcard for Eyelase Green	
3	542-1023-001	Cover, Housing	
4	542-1025-001	Handle, Cover	
5	542-1043-501	Assy, PCB, Panel Back	
6	542-1230-501	Assy, PCB, Analog, Litewave	
7	542-1150-001	Power Supply Module (complete assembly)	See Table 6-2 for complete breakdown.
8	542-1151-001	Assy, Laser Head	
9	542-1018-501	Assy, Optic Block (complete assembly)	See Table 6-3 for complete breakdown.
10	542-1139-501	Assy, Front Panel	with key and panic switches
11	542-1030-001	Display, PCB, Assy, Power	
12	542-1028-001	Keypad, Elastomer	
13	542-1027-001	Assy, PCB, Display	
14	542-1042-501	Assy, PCB, Front Panel	
15	542-1044-501	Assy, PCB, Optics	
16	542-1143-501	Laser Head Fan	Used for Power Supply also.
17	542-1045-501	Assy, PCB, Interface	

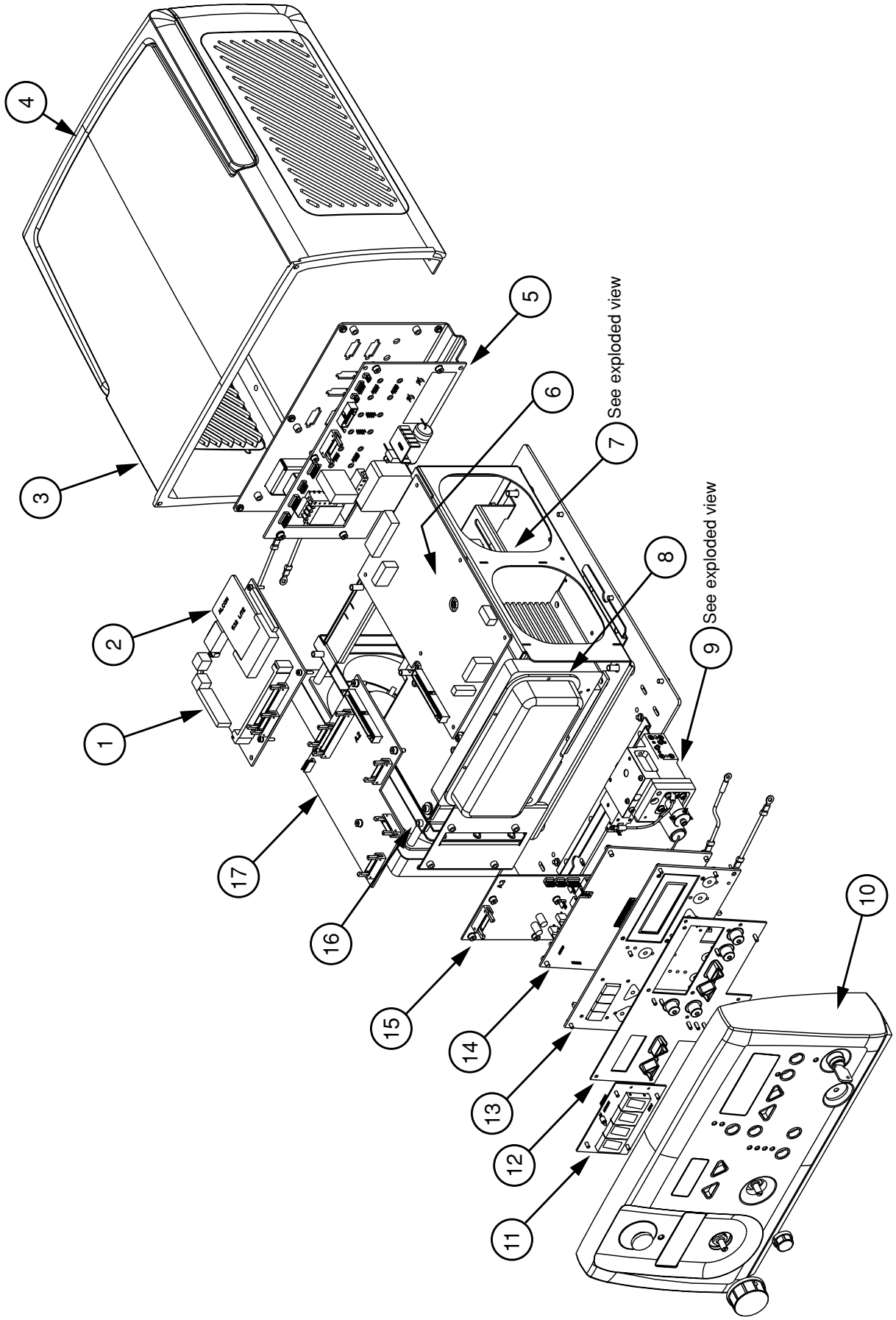


Figure 6-1
System Parts Breakdown

Table 6-2
Power Module (542-1150-001) Parts List

ITEM	PART NUMBER	DESCRIPTION	COMMENT
1	542-1147-001	Power Supply, 40 Watt	Electronics Power Supply
2	542-1148-001	Power Supply, 300 Watt	Laser Power Supply
3	542-1146-001	Relay, Solid State	

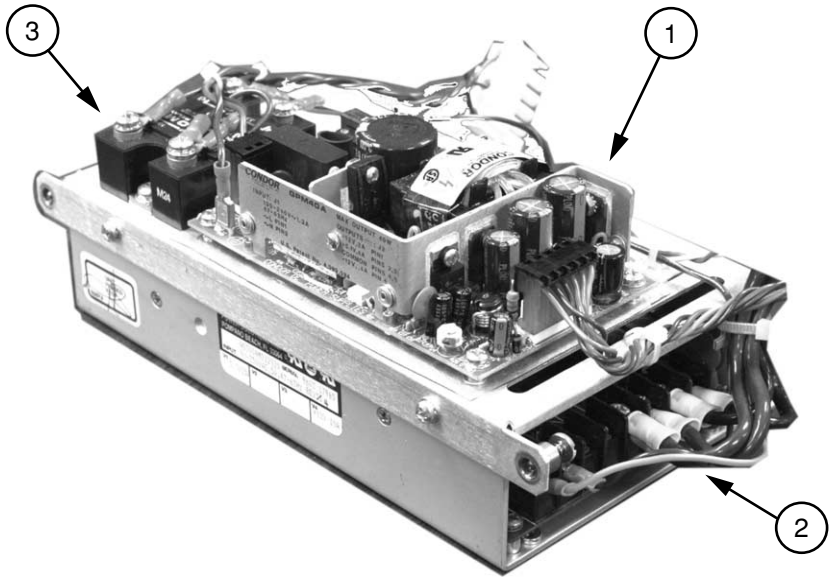


Figure 6-2
Power Module (Item 6 on System View)

Table 6-3
Optics Block (542-1018-501) Parts List

ITEM	PART NUMBER	DESCRIPTION	COMMENT
1	542-1136-501	Assy, Mirror, Fold1, Premount	Quantity of 2
2	542-1137-501	Assy, Mirror, Dichroic, Premount	Includes Cell 3
3	542-1140-501	Assy, Aim Laser w/Sleeve	Includes cable
4	542-1135-501	Assy, Chimney w/Lens and Sensor	Does not include mounting block.
5	542-1138-501	Assy, Motor/Shutter	Includes cable

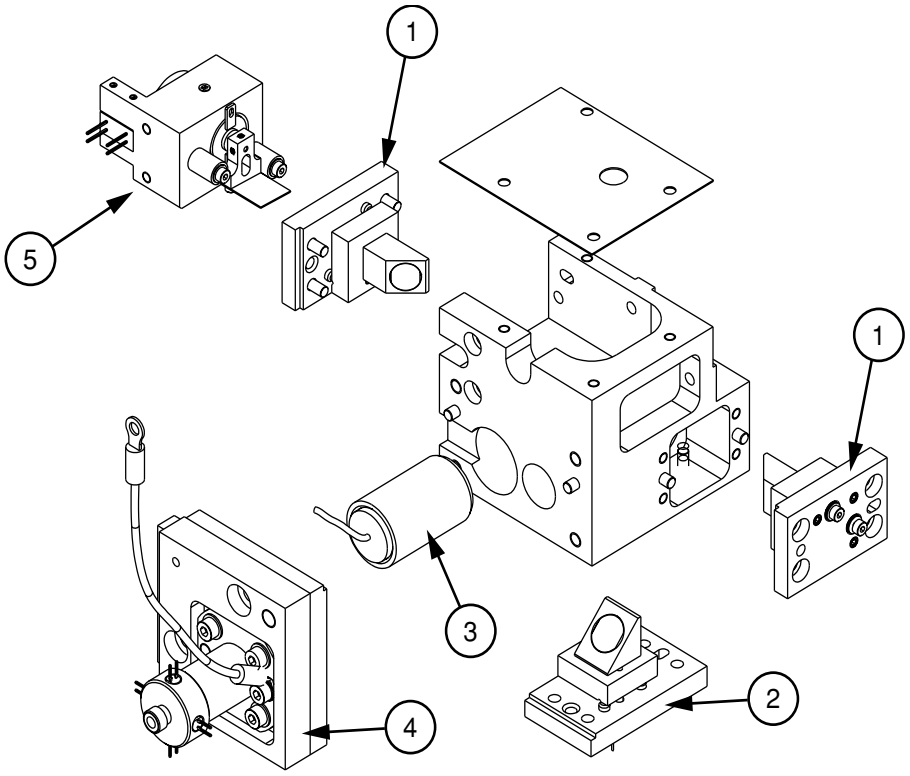


Figure 6-3
Optics Block (Item 8 on System View)

PARTS LISTS

TITLE: ASSY,CONSOLE,EYELITE
542-0000-501 and -502

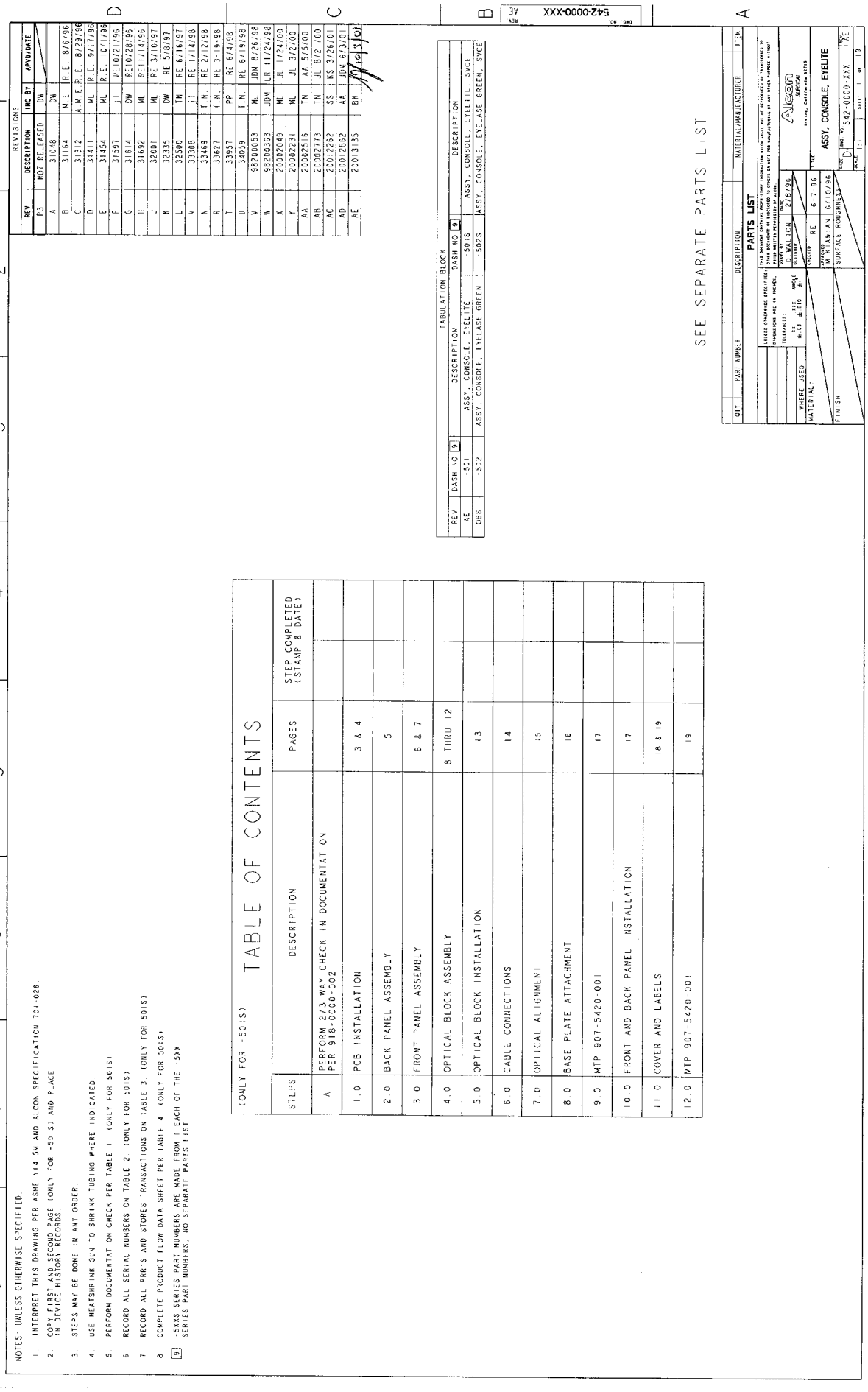
DWG ITEM	PART NUMBER	DESCRIPTION	QTY		REMARKS
001	542-1017-001	ENGINE,LASER,532NM	1.0	EA	
	542-1404-501	ASSY,ENGINE,LASER	1.0	EA	* SUBSTITUTE PART *
002	542-1045-501	ASSY,PCB,INTERFACE	1.0	EA	
003	542-1038-001	COMPUTER,SINGLE BOARD,386EX	1.0	EA	
004	542-1044-501	ASSY,PCB,OPTICS	1.0	EA	
005	542-1035-001	BRACKET,OPTICS PCB	1.0	EA	
007	542-1022-001	BRACKET,PANEL,REAR	1.0	EA	
008	542-1043-501	ASSY,PCB,PANEL BACK	1.0	EA	
009	200-1582-502	ASSY,CABLE,GROUND CT 2.0	3.0	EA	
010	263-133	SWITCH,PB,SPST W/RED CAP	1.0	EA	
011	542-1024-001	PANEL,DISPLAY	1.0	EA	for -501 only
011	542-1024-002	PANEL,DISPLAY, EYELASE	1.0	EA	for -502 only
012	222-123	POTENTIOMETER,5K,1W 5% 3TRN	1.0	EA	
014	542-1090-001	KNOB,POWER ADJUST	1.0	EA	
015	542-1074-001	CABLE,W25,AIMING BEAM POT	2.0	EA	
016	222-127	POTENTIOMETER,5K,ST	1.0	EA	
017	542-1089-001	KNOB,AIM BEAM	1.0	EA	
018	813-002	NUT,HEX,M4X0.7 W/LOCK WASHER	7.0	EA	
019	807-013	SCREW,CAP HD SKT,M4X8 SST	44.0	EA	
020	807-015	SCREW,CAP HD SKT,M4X12 SST	10.0	EA	
021	821-090	SPACER,4.1X6.0X14MM,SST	3.0	EA	
022	800-204	WASHER,INT LOCK,M4 SST	34.0	EA	
023	542-1087-001	LABEL,WARNING,LIABILITY/WARR	1.0	EA	
024	542-1046-003	LABEL,NAMEPLATE	1.0	EA	for -501 only
024	542-1046-002	LABEL,NAMEPLATE, MEDITEC	1.0	EA	for -502 only
025	262-077	SWITCH,KEY,ROUND 250VAC 5A	1.0	EA	
026	542-1075-001	CABLE,W26,KEYSWITCH	1.0	EA	
027	542-1072-001	CABLE,W23,PANIC SW/FRONT PANEL	1.0	EA	
028	542-1037-001	WINDOW,PANEL,FRONT LCD	1.0	EA	
029	542-1037-003	WINDOW,PANEL,FRONT PWR	1.0	EA	
030	542-1037-002	WINDOW,PANEL,FRONT EXP	1.0	EA	
031	542-1028-001	KEYPAD,ELASTOMER	1.0	EA	
032	542-1027-001	DISPLAY,PCB ASSY	1.0	EA	
033	818-020	SCREW,CAP HD SKT,M3X8 SST BLK	28.0	EA	
034	800-203	WASHER,INT LOCK,M3 SST	16.0	EA	
035	542-1042-501	ASSY,PCB,FRONT PANEL	1.0	EA	
036	100-0079-501	ASSY,WIRE,GND MOTOR 6.75	2.0	EA	
037	542-1077-001	CABLE,W28,FRONT PANEL LCD	1.0	EA	
038	542-1076-001	CABLE,W27,FRONT PANEL KEYPAD	1.0	EA	
039	542-1078-001	CABLE,W29,FRONT PANEL EXP/TIME	1.0	EA	
040	542-1058-001	CABLE,W5,POWER ENTRY MOD	1.0	EA	
041	542-1054-001	LABEL,FUSE,110/220V	1.0	EA	
042	532-1385-004	FOOTSWITCH,LASER,EYELITE UL	1.0	EA	
044	542-1079-001	CABLE,W30,FRONT PANEL PWR/DSP	1.0	EA	
046	542-1064-001	CABLE,W12,CPU/INTERFACE	1.0	EA	
047	542-1066-001	CABLE,W14,INTERFACE/OPTICS	1.0	EA	
048	542-1080-001	CABLE,W11,A2J1 TO A8J2	1.0	EA	
049	542-1048-001	LASER,AIM,670NM	1.0	EA	
050	542-1005-001	SLEEVE,DIODE,AIMING	1.0	EA	
051	542-1003-001	BASE,MIRROR MOUNT,AIM	2.0	EA	
052	817-627	SETSCREW,SCH,CUP M3X4 SST BLK	4.0	EA	
053	542-1034-001	MIRROR,FLAT,8.5 DIA X 2 THK	2.0	EA	
054	542-1001-001	MOUNT,MIRROR,AIM	2.0	EA	
055	542-1016-001	SETSCREW,SOCKET HEAD,M3X8 LG	9.0	EA	
056	818-010	SCREW,CAP HD SKT,M2.0X12 SS BK	8.0	EA	
057	815-005	WASHER,SPRING,2.2X5X.4 SPR STL	78.0	EA	
058	542-1051-001	LABEL,DANGER,USA	1.0	EA	
059	542-1033-001	BEAMSPLITTER,10 DIA,3 THK	1.0	EA	
060	542-1002-001	MOUNT,DICHROIC	1.0	EA	
061	542-1050-001	FILTER,DETECTOR	1.0	EA	
062	542-1004-001	BASE,MIRROR MOUNT,DICHROIC	1.0	EA	
063	227-054	DIODE,PHOTO,40V	1.0	EA	
064	542-1070-001	CABLE,W18,CELL 3/OPTIC PCB	1.0	EA	
065	194-178	MOTOR,DC,10VDC 311MA	1.0	EA	
066	542-1069-001	CABLE,W17,OPTIC/SHUT MTR	1.0	EA	
067	542-1011-001	FLAP,SHUTTER	1.0	EA	
068	542-1012-001	HUB,FRONT,SHUTTER	1.0	EA	
069	818-000	SCREW,CAP HD SKT,M1.6X3 SST BK	4.0	EA	
070	817-601	SETSCREW,SCH,CUP M1.6X2.5 SSBK	4.0	EA	
071	542-1010-001	BUMPER,SHUTTER	2.0	EA	

PARTS LISTS

DWG ITEM	PART NUMBER	DESCRIPTION	QTY		REMARKS
072	542-1015-001	MOUNT,SHUTTER	1.0	EA	
073	801-101	WASHER,FLAT,M2.0 SST W/BLK OXD	2.0	EA	
074	542-1013-001	HUB,BACK,SHUTTER	1.0	EA	
075	542-1014-001	SLIT,SHUTTER	1.0	EA	
076	542-1068-001	CABLE,W16,OPTIC/SHUTTER	1.0	EA	
078	542-1007-001	MOUNT,FIBEROPTIC	1.0	EA	
079	542-1081-001	PORT,FIBER OPTIC,SMA	1.0	EA	
080	100-0079-503	ASSY,WIRE,GND MOTOR 6.75 NO 6	1.0	EA	
081	801-103	WASHER,FLAT,M3 SST W/BLK OXD	4.0	EA	
082	818-031	SCREW,CAP HD SKT,M4X10 SST BLK	3.0	EA	
083	542-1008-001	BLOCK,OPTICAL	1.0	EA	
084	818-022	SCREW,CAP HD SKT,M3X12 SST BLK	5.0	EA	
085	818-029	SCREW,CAP HD SKT,M4X6 SST BLK	2.0	EA	
086	130-179	FUSE,6.3A,250V 5X20MM SLOW BLO	2.0	EA	
087	542-1061-001	CABLE,W8,ANALOG/BACK PANEL	1.0	EA	
089	542-1059-001	CABLE,W6,ANALOG/BACK PANEL	1.0	EA	
090	542-1055-001	CABLE ASSY,W1,BACKPANEL/INTFC	1.0	EA	
091	542-1062-001	CABLE,W9,BACK PANEL/INTERFACE	1.0	EA	
092	542-1063-001	CABLE,W10,BACK PNL/CPU RADYSIS	.0	EA	
093	542-1056-001	CABLE,W3,CPU/BACK PANEL	1.0	EA	
094	542-1032-001	PLATE,BOTTOM	1.0	EA	
095	786-009	SCREW,CAP HD SKT.25-20X.375 CS	4.0	EA	
096	797-065	WASHER,EXT LOCK.26X.51X.03 SST	4.0	EA	
097	801-004	WASHER,FLAT,M4 SST	3.0	EA	
098	542-1031-001	BRACKET,DISPLAY,RIGHT W/STUD	1.0	EA	
099	542-1031-002	BRACKET,DISPLAY,LEFT W/O STUD	1.0	EA	
100	542-1057-001	CABLE,W4,BACKPANEL/FRONTPANEL	1.0	EA	
101	542-1067-001	CABLE,W15,INTERFACE/FRONT PNL	1.0	EA	
102	542-1071-001	CABLE,W22,CPU/FRONT PANEL	1.0	EA	
103	023-015	CABLE ASSY,3 COND,120V PLUG UL	1.0	EA	
104	542-1006-001	BASE,FIBEROPTIC	1.0	EA	
105	600-130	BEARING,BALL,07MM SST	1.0	EA	
106	818-024	SCREW,CAP HD SKT,M3X20 SST BLK	2.0	EA	
107	815-004	WASHER,SPRING,3.2X8.0X0.4 BLK	26.0	EA	
108	803-003	NUT,HEX,M3X.5 SST	1.0	EA	
109	532-1125-001	BARREL	1.0	EA	
110	532-1125-002	BARREL,COUNTER	1.0	EA	
111	532-1231-001	ACHROMAT,18.3MM	1.0	EA	
113	542-1030-001	DISPLAY,PCB ASSY,POWER	1.0	EA	
114	542-1091-001	SHIELD,LASER,BACKSCATTER	1.0	EA	
115	809-001	SCREW,BTN HD SKT,M3X6 SST	2.0	EA	
116	892-302	ADHESIVE,EPOXY,WHITE 2 PARTS	.0	EA	
117	280-017	SENSOR,PHOTODARLINGTON,.1 SLOT	1.0	EA	
118	653-025	FOOT,RUBBER,1.187 SQ X .469H	4.0	EA	
119	807-016	SCREW,CAP HD SKT,M4X16 SST	4.0	EA	
120	040-009	TUBING,HEAT SHRINK,.093 ID BLK	.40	FT	
121	241-041	PHOTOTRANSISTOR,4MA,T-1	2.0	EA	
122	240-131	LED,IR,940NM T-1	2.0	EA	
123	532-1393-001	LABEL,CAUTION,HIGH VOLTAGE	2.0	EA	
124	542-1053-001	LABEL,LASER RADIATION	2.0	EA	
126	542-1023-001	COVER,HOUSING	1.0	EA	
127	542-1025-001	HANDLE,COVER	1.0	EA	
128	804-013	SCREW,SHLDR,M4X0.7X16 SLT SST	2.0	EA	
129	532-1208-001	LABEL,POSSIBLE EXPLOSION	1.0	EA	
130	532-1394-001	LABEL,WARNING,DOCTORS FILTER	1.0	EA	
131	542-1103-001	GASKET,FOAM,FAN	1.0	EA	
132	542-1092-001	SHIELD,FIBER OPTIC,RUBBER	1.0	EA	
133	542-1093-001	BRACKET,RETAINER,SHIELD	1.0	EA	
134	674-139	CAP,LENS,GRN LED T-1 .062 THK	1.0	EA	
135	674-140	CAP,LENS,RED LED T-1 .125 THK	1.0	EA	
136	542-1099-001	CABLE,W31,FIBER DETECTION	2.0	EA	
138	542-1101-001	CABLE,W33,FOOTSWITCH	1.0	EA	
139	542-1097-001	TAPE,ADHESIVE,LCD WINDOW	1.0	EA	
140	542-1097-002	TAPE,ADHESIVE,EXP WINDOW	1.0	EA	
141	542-1097-003	TAPE,ADHESIVE,PWR WINDOW	1.0	EA	
142	821-088	SPACER,4.1X6.0X12MM,SST	1.0	EA	
143	690-1121	LABEL,GROUND	1.0	EA	
144	542-1105-506	ASSY,FLASH CARD,PRGMD V1.30	1.0	EA	for -501 only
144	542-1227-502	ASSY,FLASH CARD,PRGMD, EYELASE V1.10	1.0	EA	for -502 only
145	798-014	WASHER,FLAT,NO.10 .062 THK NYL	2.0	EA	
147	542-1104-001	LABEL,ID,LASER	1.0	EA	
148	818-023	SCREW,CAP HD SKT,M3X16 SST BLK	4.0	EA	
150	542-1102-001	CABLE,EMERGENCY SWITCH,FR PNL	1.0	EA	

PARTS LISTS

DWG ITEM	PART NUMBER	DESCRIPTION	QTY		REMARKS
151	817-612	SETSCREW,SCH,CUP M2.0X6 SST BK	2.0	EA	
152	542-1096-001	SCREW,ADJUST,BALL END M5X0.25	2.0	EA	
153	542-1063-002	CABLE,W10,BACK PANEL/CPU INTEL	1.0	EA	
154	798-053	WASHER,INSUL,.141X.312X.03 NYL	4.0	EA	
155	646-022	CAP,MECH THD,DUST COVER	1.0	EA	
156	542-1088-501	ASSY,PLUG,REMOTE	1.0	EA	
157	691-236	SPRING,CPRSN,.437X.625 SST	1.0	EA	
158	200-1582-503	ASSY,CABLE,GROUND CT 3.5	1.0	EA	
159	100-0079-502	ASSY,WIRE,GND MOTOR 9.00	1.0	EA	
160	542-1134-001	SIMM,DRAM,1MX32	.0	EA	
161	807-153	SCREW,CAP HD SKT,M3X4 SST	1.0	EA	
162	796-099	WASHER,FLAT,.265X.500X.062 SST	4.0	EA	
TOTAL COMPONENTS:	151				



NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET THIS DRAWING PER ASME Y14.5M AND ALCON SPECIFICATION 701-026.
2. COPY FIRST AND SECOND PAGE (ONLY FOR -501S) AND PLACE IN DEVICE HISTORY RECORDS.
3. STEPS MAY BE DONE IN ANY ORDER.
4. USE HEATSHRINK GUN TO SHRINK TUBING WHERE INDICATED.
5. PERFORM DOCUMENTATION CHECK PER TABLE 1. (ONLY FOR 501S)
6. RECORD ALL SERIAL NUMBERS ON TABLE 2. (ONLY FOR 501S)
7. RECORD ALL PRR'S AND STORES TRANSACTIONS ON TABLE 3. (ONLY FOR 501S)
8. COMPLETE PRODUCT FLOW DATA SHEET PER TABLE 4. (ONLY FOR 501S)

[9] -5XXS SERIES PART NUMBERS ARE MADE FROM EACH OF THE -5XX SERIES PART NUMBERS. NO SEPARATE PARTS LIST.

REVISIONS

REV	DESCRIPTION	INC BY	APVD/DATE
P3	NOT RELEASED	DW	
A	31048	DW	
B	31164	M.S.	R.E. 8/6/96
C	31312	A.M.E.	R.E. 8/29/96
D	31411	ML	R.E. 9/17/96
E	31454	ML	R.E. 10/1/96
F	31597	JJ	RE 10/21/96
G	31614	DW	RE 10/28/96
H	31692	ML	RE 11/14/96
J	32001	ML	RE 3/10/97
K	32335	DW	RE 5/8/97
L	32500	TN	RE 6/16/97
M	33308	JJ	RE 1/14/98
N	33469	T.N.	RE 2/12/98
R	33627	T.N.	RE 3-19-98
T	33957	PP	RE 6/4/98
U	34059	T.N.	RE 6/19/98
V	98200053	ML	JDM 8/26/98
W	98200363	JDM	LA 11/24/98
X	20002049	ML	JL 1/24/00
Y	20002231	ML	JL 3/2/00
AA	20002516	TN	AA 5/5/00
AB	20002773	TN	JL 8/21/00
AC	20012262	SS	KS 3/26/01
AD	20012662	AA	JDM 6/3/01
AE	22013135	BR	[illegible]

TABULATION BLOCK

REV	DASH NO [9]	DESCRIPTION
AE	-501	ASSY, CONSOLE, EYELITE
AE	-502	ASSY, CONSOLE, EYELASE GREEN

REV	DASH NO [9]	DESCRIPTION
AE	-501S	ASSY, CONSOLE, EYELITE, SVCE
OBS	-502S	ASSY, CONSOLE, EYELASE GREEN, SVCE

542-0000-XXX

SEE SEPARATE PARTS LIST

PARTS LIST

QTY	PART NUMBER	DESCRIPTION	MATERIAL/MANUFACTURER	ITEM

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: FX ± .03, FRACTIONS ± 1/16, ANGLES ±1°

WHERE USED

MATERIAL:

FINISH:

DRAWN BY: D. WALTON 2/16/96

CHECKED: RE 6-7-96

APPROVED: M. KAVANAH 6/10/96

SURFACE ROUGHNESS

Alcon LABORATORIES, INC. FORT WORTH, TEXAS

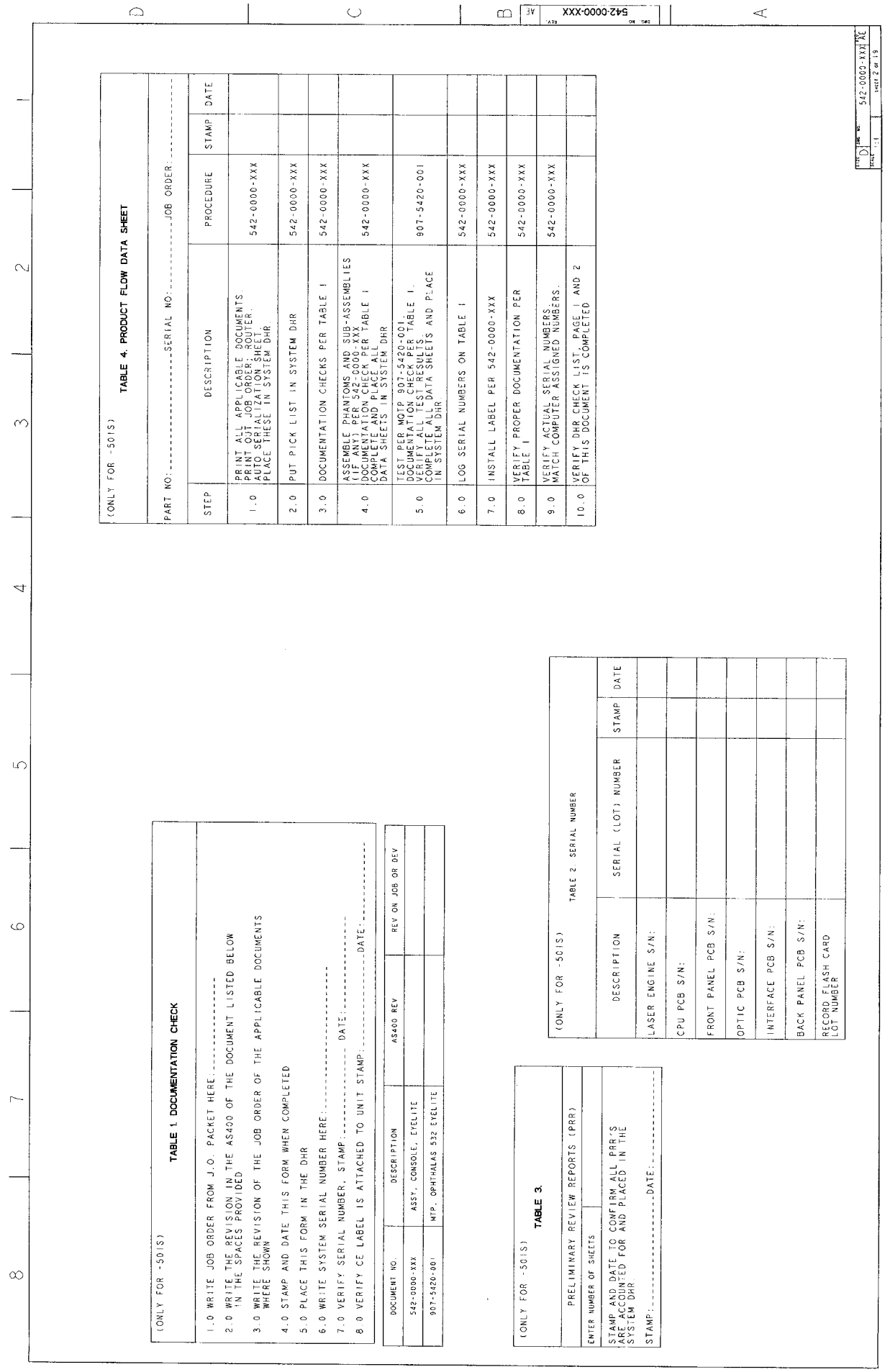
TITLE: ASSY, CONSOLE, EYELITE

SIZE D DWG NO 542-0000-XXX REV AE

SCALE 1:1 SHEET 1 OF 19

(ONLY FOR -501S) TABLE OF CONTENTS

STEPS	DESCRIPTION	PAGES	STEP COMPLETED (STAMP & DATE)
A	PERFORM 2/3 WAY CHECK IN DOCUMENTATION PER 918-0000-002		
1.0	PCB INSTALLATION	3 & 4	
2.0	BACK PANEL ASSEMBLY	5	
3.0	FRONT PANEL ASSEMBLY	6 & 7	
4.0	OPTICAL BLOCK ASSEMBLY	8 THRU 12	
5.0	OPTICAL BLOCK INSTALLATION	13	
6.0	CABLE CONNECTIONS	14	
7.0	OPTICAL ALIGNMENT	15	
8.0	BASE PLATE ATTACHMENT	16	
9.0	MTP 907-5420-001	17	
10.0	FRONT AND BACK PANEL INSTALLATION	17	
11.0	COVER AND LABELS	18 & 19	
12.0	MTP 907-5420-001	19	



(ONLY FOR -501S)

TABLE 1. DOCUMENTATION CHECK

1.0 WRITE JOB ORDER FROM J.O. PACKET HERE:----------

2.0 WRITE THE REVISION IN THE AS400 OF THE DOCUMENT LISTED BELOW IN THE SPACES PROVIDED

3.0 WRITE THE REVISION OF THE JOB ORDER OF THE APPLICABLE DOCUMENTS WHERE SHOWN

4.0 STAMP AND DATE THIS FORM WHEN COMPLETED

5.0 PLACE THIS FORM IN THE DHR

6.0 WRITE SYSTEM SERIAL NUMBER HERE:----------

7.0 VERIFY SERIAL NUMBER, STAMP:---------- DATE:----------

8.0 VERIFY CE LABEL IS ATTACHED TO UNIT STAMP:---------- DATE:----------

DOCUMENT NO.	DESCRIPTION	AS400 REV	REV ON JOB OR DEV
542-0000-XXX	ASSY, CONSOLE, EYELITE		
907-5420-001	MTP, OPHTHALAS 532 EYELITE		

(ONLY FOR -501S)

TABLE 3.

PRELIMINARY REVIEW REPORTS (PRR)

ENTER NUMBER OF SHEETS

STAMP AND DATE TO CONFIRM ALL PRR'S ARE ACCOUNTED FOR AND PLACED IN THE SYSTEM DHR

STAMP:----------DATE:----------

(ONLY FOR -501S)

TABLE 2. SERIAL NUMBER

DESCRIPTION	SERIAL (LOT) NUMBER	STAMP	DATE
LASER ENGINE S/N:			
CPU PCB S/N:			
FRONT PANEL PCB S/N:			
OPTIC PCB S/N:			
INTERFACE PCB S/N:			
BACK PANEL PCB S/N:			
RECORD FLASH CARD LOT NUMBER			

(ONLY FOR -501S)

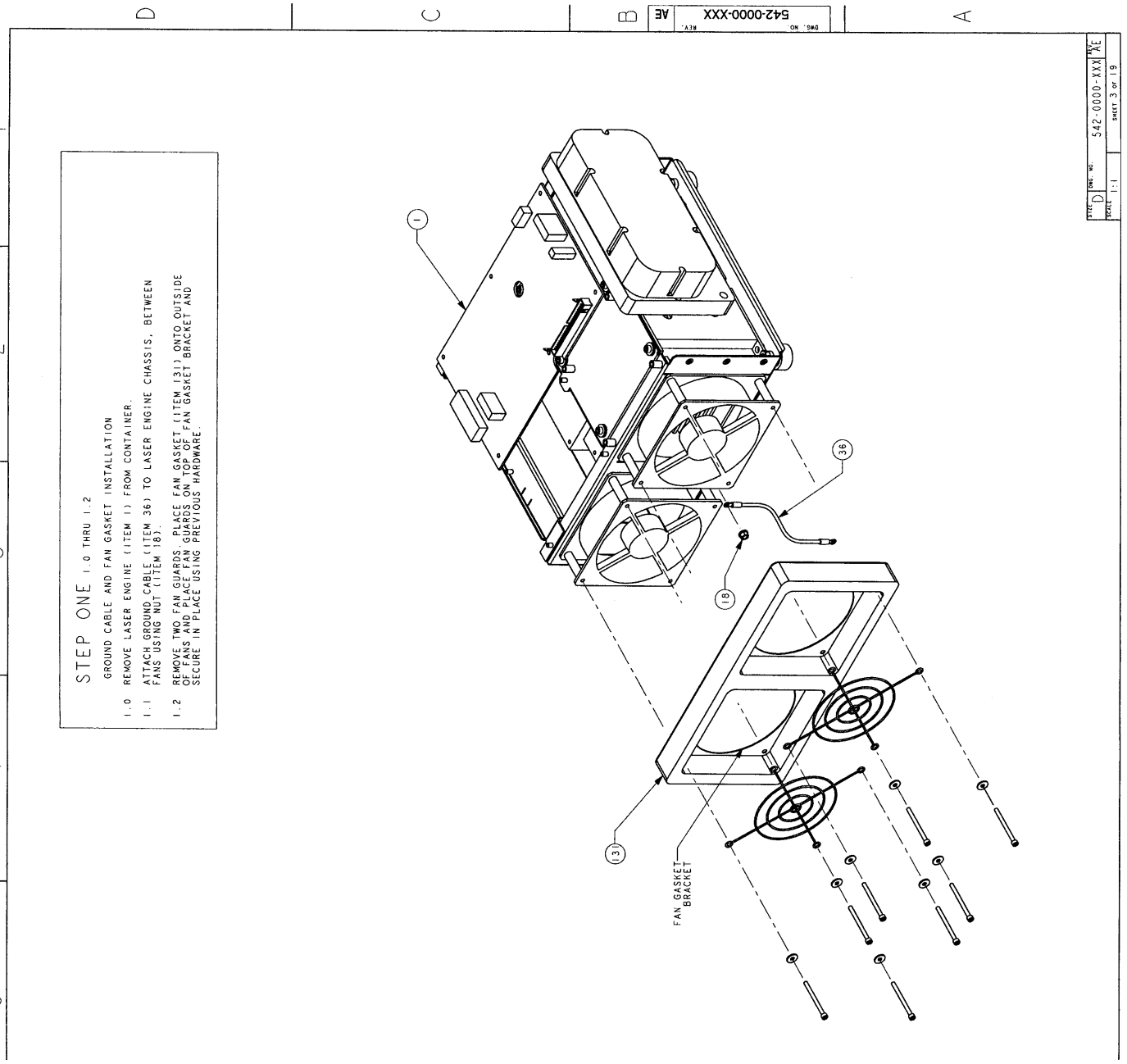
TABLE 4. PRODUCT FLOW DATA SHEET

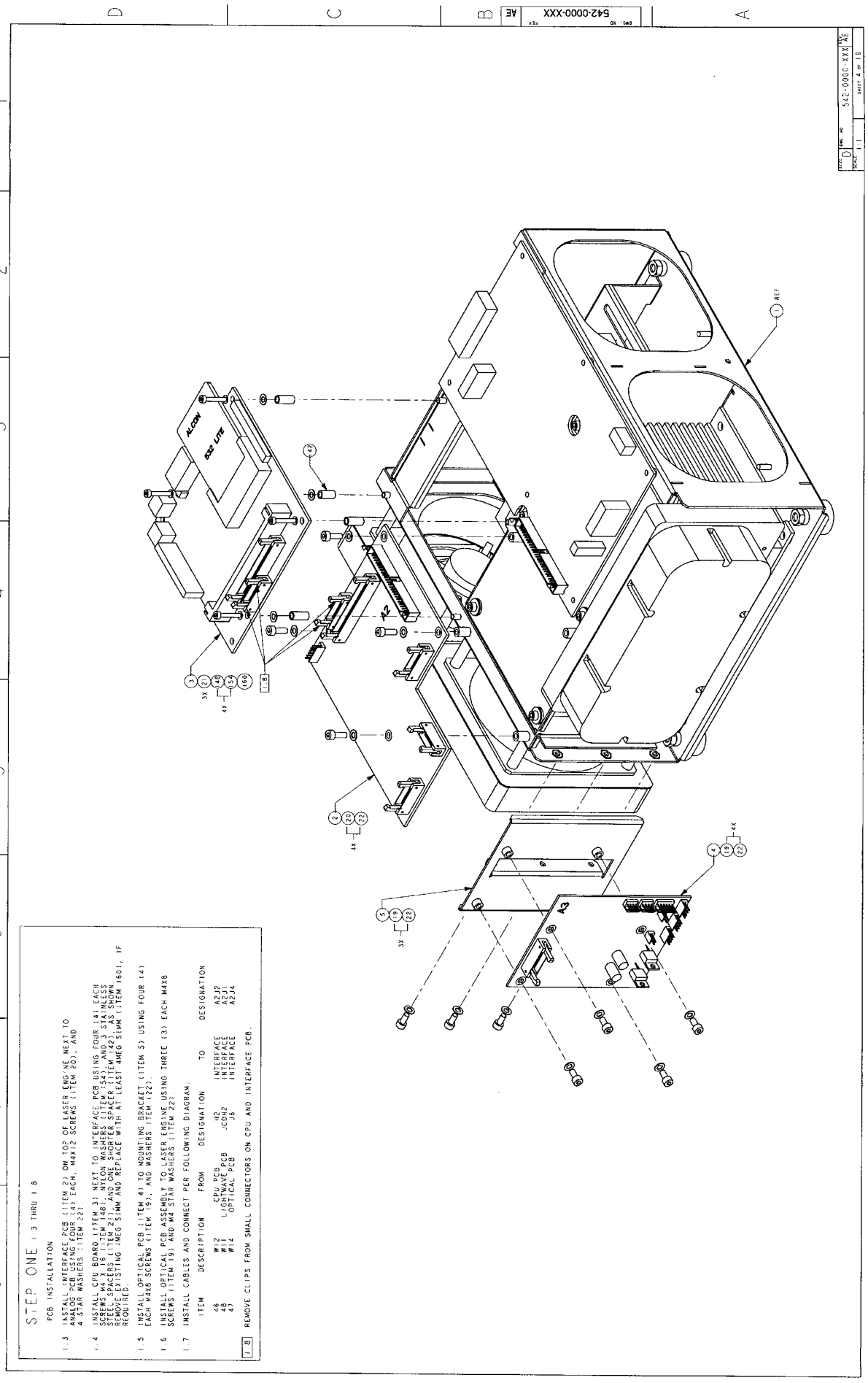
PART NO:----------SERIAL NO:----------JOB ORDER:----------

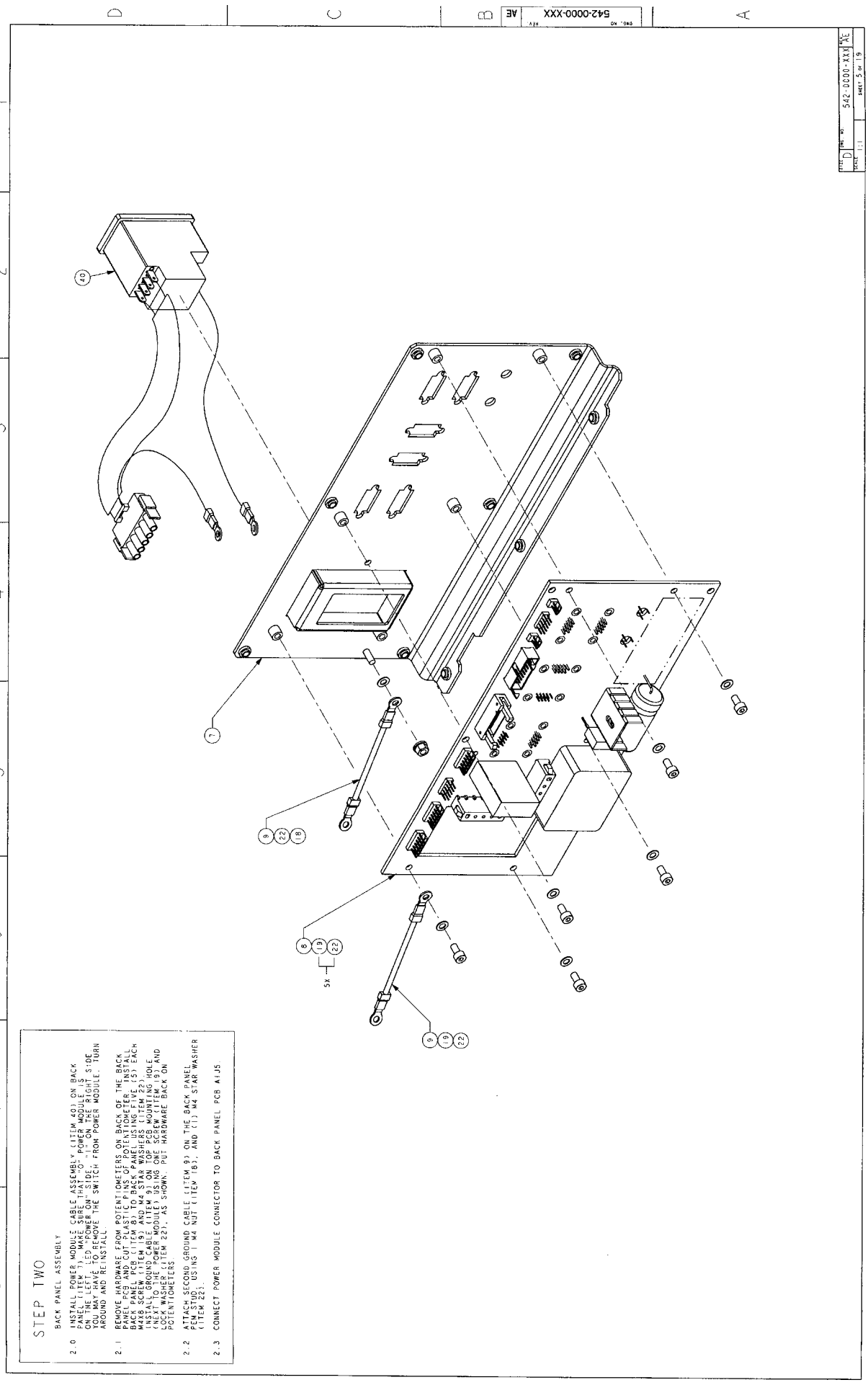
STEP	DESCRIPTION	PROCEDURE	STAMP	DATE
1.0	PRINT ALL APPLICABLE DOCUMENTS. PRINT OUT JOB ORDER; ROUTER. AUTO SERIALIZATION SHEET. PLACE THESE IN SYSTEM DHR.	542-0000-XXX		
2.0	PUT PICK LIST IN SYSTEM DHR	542-0000-XXX		
3.0	DOCUMENTATION CHECKS PER TABLE 1	542-0000-XXX		
4.0	ASSEMBLE PHANTOMS AND SUB-ASSEMBLIES (IF ANY) PER 542-0000-XXX DOCUMENTATION. CHECK OFF PER TABLE 1 COMPLETE AND PLACE ALL DATA SHEETS IN SYSTEM DHR	542-0000-XXX		
5.0	TEST PER MOTP 907-5420-001. DOCUMENTATION CHECK PER TABLE 1. VERIFY ALL TEST RESULTS COMPLETE ALL DATA SHEETS AND PLACE IN SYSTEM DHR	907-5420-001		
6.0	LOG SERIAL NUMBERS ON TABLE 1	542-0000-XXX		
7.0	INSTALL LABEL PER 542-0000-XXX	542-0000-XXX		
8.0	VERIFY PROPER DOCUMENTATION PER TABLE 1	542-0000-XXX		
9.0	VERIFY ACTUAL SERIAL NUMBERS MATCH COMPUTER ASSIGNED NUMBERS.	542-0000-XXX		
10.0	VERIFY DHR CHECK LIST, PAGE 1 AND 2 OF THIS DOCUMENT IS COMPLETED			

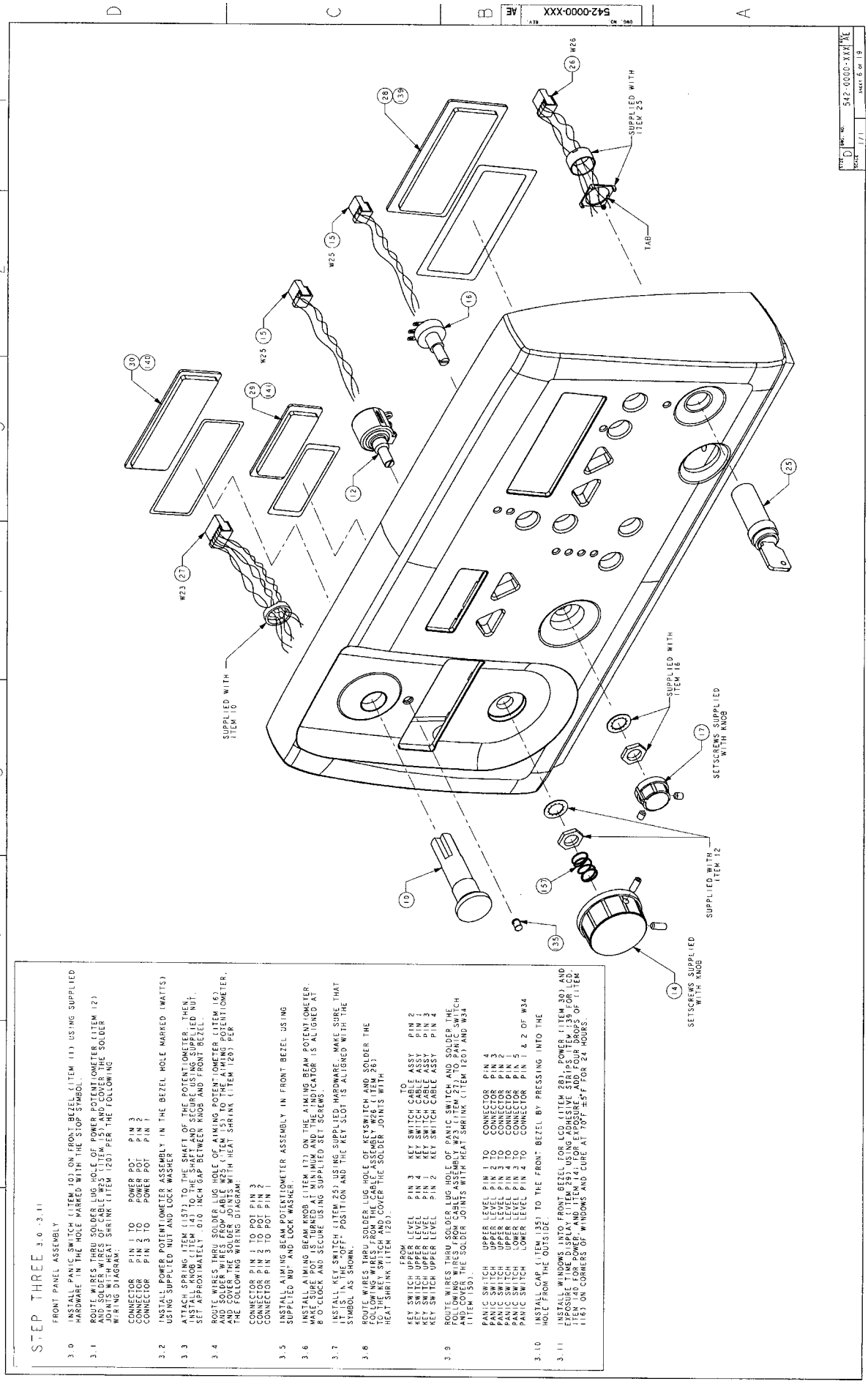
542-0000-XXX AE

D | 542-0000-XXX AE | SCALE 1:1 | SHEET 2 OF 19


STEP ONE 1.0 THRU 1.2
GROUND CABLE AND FAN GASKET INSTALLATION
1.0 REMOVE LASER ENGINE (ITEM 1) FROM CONTAINER.
1.1 ATTACH GROUND CABLE (ITEM 36) TO LASER ENGINE CHASSIS, BETWEEN FANS USING NUT (ITEM 18).
1.2 REMOVE TWO FAN GUARDS. PLACE FAN GASKET (ITEM 131) ONTO OUTSIDE OF FANS AND PLACE FAN GUARDS ON TOP OF FAN GASKET BRACKET AND SECURE IN PLACE USING PREVIOUS HARDWARE.
542-0000-XXX
AE
SHEET 3 OF 19
1
36
18
13
FAN GASKET BRACKET


STEP ONE 1.3 THRU 1.8
PCB INSTALLATION
1.3 INSTALL INTERFACE PCB (ITEM 2) ON TOP OF LASER END NEXT TO ANALOG PCB USING FOUR (4) EACH, M4X12 SCREWS (ITEM 20), AND 4 STAR WASHERS (ITEM 22).
1.4 INSTALL CPU BOARD (ITEM 3) NEXT TO INTERFACE PCB USING FOUR (4) EACH SCREWS M4 X 8 (ITEM 18), NYLON WASHERS (ITEM 541), AND 3 STAINLESS STEEL SPACERS (ITEM 140). ANODIZED SPACER (ITEM 21) AS SHOWN. REMOVE EXISTING IMEG 25MM AND REPLACE WITH AT LEAST 40MEG 25MM (ITEM 1601, IF REQUIRED.
1.5 INSTALL OPTICAL PCB (ITEM 4) TO MOUNTING BRACKET (ITEM 5) USING FOUR (4) EACH M4X6 SCREWS (ITEM 19), AND WASHERS (ITEM 22).
1.6 INSTALL OPTICAL PCB ASSEMBLY TO LASER ENCLOSURE USING THREE (3) EACH M4X8 SCREWS (ITEM 19), AND M4 STAR WASHERS (ITEM 22).
1.7 INSTALL CABLES AND CONNECT PER FOLLOWING DIAGRAM.
ITEM DESCRIPTION FROM DESIGNATION TO DESIGNATION
48 W12 CPU PCB J2 INTERFACE A2J2
48 W13 LIGHT ENGINE PCB J002 INTERFACE A2J1
47 W14 OPTICAL PCB J8 INTERFACE A2J4
1.8 REMOVE CLIPS FROM SMALL CONNECTORS ON CPU AND INTERFACE PCB.
542-0000-XXX
REF
3X
4X


542-0000-XXX
AE
STEP TWO
BACK PANEL ASSEMBLY
2.0 INSTALL POWER MODULE CABLE ASSEMBLY (ITEM 40) ON BACK PANEL (ITEM 7). MAKE SURE THAT "O" POWER MODULE IS ON THE RIGHT SIDE. YOU MAY HAVE TO REMOVE THE SWITCH FROM POWER MODULE, TURN AROUND AND REINSTALL.
2.1 REMOVE HARDWARE FROM POTENTIOMETERS ON BACK OF THE BACK PANEL AND CUT PLASTIC SHAFT OF POTENTIOMETER. INSTALL BACK PANEL PCB (ITEM 8) TO BACK PANEL USING FIVE (5) EACH M4X8 SCREW (ITEM 19) AND M4 STAR WASHERS (ITEM 22). INSTALL GROUND WIRE (ITEM 9) TO ONE OF SCREW (IN STEP 2.1) THAT MOUNTS POWER MODULE TO BACK PANEL. USE LOCK WASHER (ITEM 22). AS SHOWN. PUT HARDWARE BACK ON POTENTIOMETERS
2.2 ATTACH SECOND GROUND CABLE (ITEM 9) ON THE BACK PANEL PEM STUD. USING 1 M4 NUT (ITEM 18), AND (1) M4 STAR WASHER (ITEM 22).
2.3 CONNECT POWER MODULE CONNECTOR TO BACK PANEL PCB AT J5.
5x



STEP THREE 3.0 - 3.11

FRONT PANEL ASSEMBLY

3.0 INSTALL PANIC SWITCH (ITEM 10) ON FRONT BEZEL (ITEM 11) USING SUPPLIED HARDWARE IN THE HOLE MARKED WITH THE "STOP" SYMBOL.

3.1 ROUTE WIRES THRU SOLDER LUG HOLE OF POWER POTENTIOMETER (ITEM 12) AND SOLDER WIRES FROM CABLE ASSEMBLY W26 (ITEM 26). INSULATE SOLDER JOINTS WITH HEAT SHRINK (ITEM 120) PER THE FOLLOWING WIRING DIAGRAM:

CONNECTOR	PIN 1 TO	POWER POT PIN 3
CONNECTOR	PIN 2 TO	POWER POT PIN 2
CONNECTOR	PIN 3 TO	POWER POT PIN 1

3.2 INSTALL POWER POTENTIOMETER ASSEMBLY IN THE BEZEL HOLE MARKED (WATTS) USING SUPPLIED NUT AND LOCK WASHER

3.3 ATTACH SPRING (ITEM 157) TO THE SHAFT OF THE POTENTIOMETER, THEN INSTALL KNOB (ITEM 14) TO THE SHAFT AND SECURE USING SUPPLIED NUT. SET APPROXIMATELY .010 INCH GAP BETWEEN KNOB AND FRONT BEZEL.

3.4 ROUTE WIRES THRU SOLDER LUG HOLE OF AIMING POTENTIOMETER (ITEM 16) AND SOLDER WIRES FROM CABLE W25 (ITEM 15) TO THE AIMING POTENTIOMETER. AND COVER THE SOLDER JOINTS WITH HEAT SHRINK (ITEM 120) PER THE FOLLOWING WIRING DIAGRAM:

CONNECTOR	PIN 1 TO	POT PIN 3
CONNECTOR	PIN 2 TO	POT PIN 2
CONNECTOR	PIN 3 TO	POT PIN 1

3.5 INSTALL AIMING BEAM POTENTIOMETER ASSEMBLY IN FRONT BEZEL USING SUPPLIED NUT AND LOCK WASHER.

3.6 INSTALL AIMING BEAM KNOB (ITEM 17) ON THE AIMING BEAM POTENTIOMETER. MAKE SURE POT IS TURNED AT MINIMUM AND THE INDICATOR IS ALIGNED AT 8 O'CLOCK AND SECURE USING SUPPLIED SET SCREWS.

3.7 INSTALL KEY SWITCH (ITEM 25) USING SUPPLIED HARDWARE. MAKE SURE THAT IT IS IN THE "OFF" POSITION AND THE KEY SLOT IS ALIGNED WITH THE SYMBOL AS SHOWN.

3.8 ROUTE WIRES THRU SOLDER LUG HOLE OF KEYSWITCH AND SOLDER THE FOLLOWING WIRES FROM THE CABLE ASSEMBLY W26 (ITEM 26) TO THE KEY SWITCH AND COVER THE SOLDER JOINTS WITH HEAT SHRINK (ITEM 120):

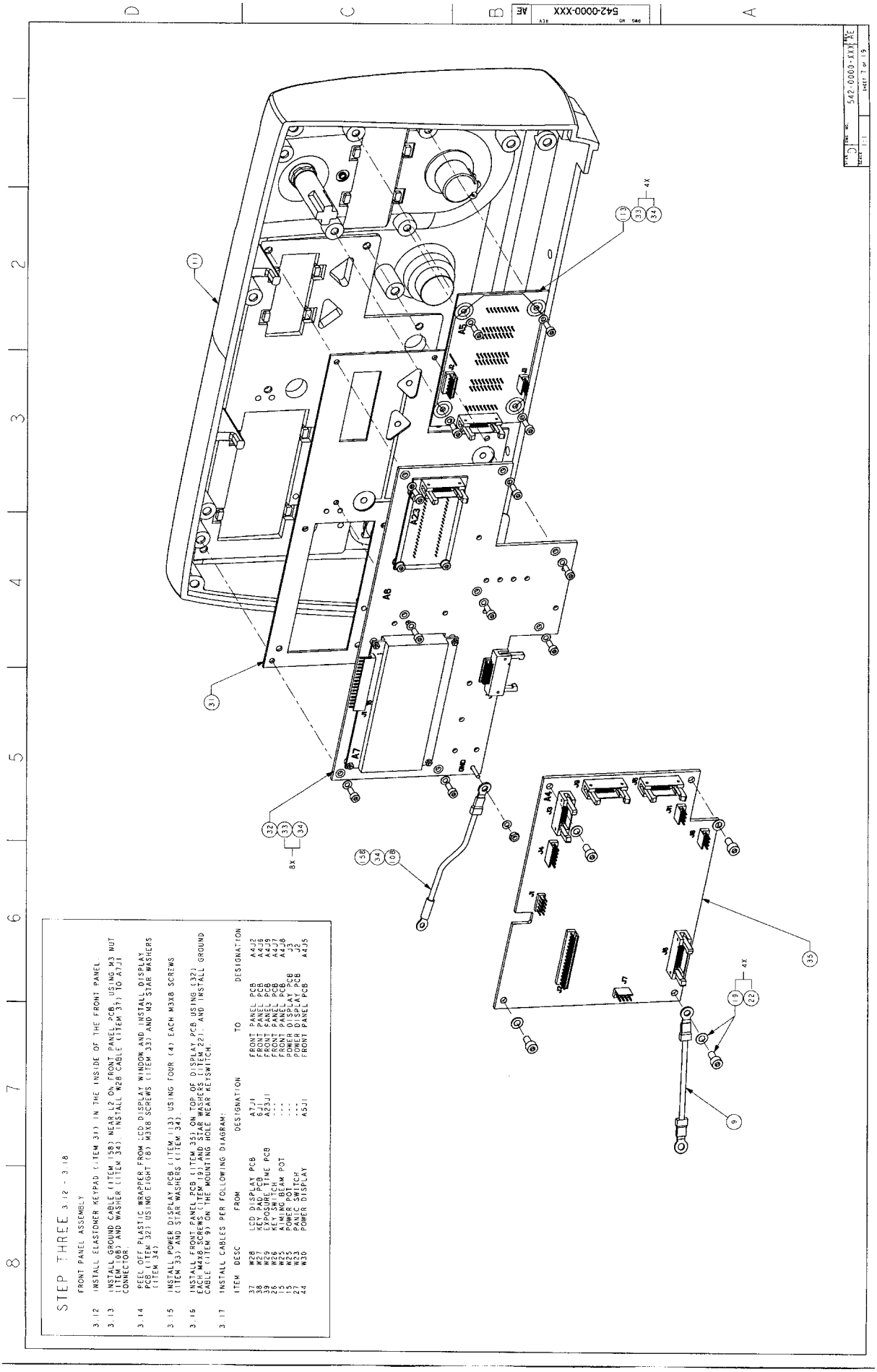
FROM		TO	
KEY SWITCH UPPER LEVEL	PIN 3	KEY SWITCH CABLE ASSY	PIN 2
KEY SWITCH UPPER LEVEL	PIN 4	KEY SWITCH CABLE ASSY	PIN 1
KEY SWITCH UPPER LEVEL	PIN 1	KEY SWITCH CABLE ASSY	PIN 3
KEY SWITCH UPPER LEVEL	PIN 2	KEY SWITCH CABLE ASSY	PIN 4

3.9 ROUTE WIRES THRU SOLDER LUG HOLE OF PANIC SWITCH AND SOLDER THE FOLLOWING WIRES FROM CABLE ASSEMBLY W23 (ITEM 27) TO PANIC SWITCH AND COVER THE SOLDER JOINTS WITH HEAT SHRINK (ITEM 120) AND W34 (ITEM 150).

PANIC SWITCH	UPPER LEVEL PIN 1 TO	CONNECTOR	PIN 4
PANIC SWITCH	UPPER LEVEL PIN 2 TO	CONNECTOR	PIN 3
PANIC SWITCH	UPPER LEVEL PIN 3 TO	CONNECTOR	PIN 2
PANIC SWITCH	UPPER LEVEL PIN 4 TO	CONNECTOR	PIN 1
PANIC SWITCH	LOWER LEVEL PIN 3 TO	CONNECTOR	PIN 5
PANIC SWITCH	LOWER LEVEL PIN 4 TO	CONNECTOR	PIN 1 & 2 OF W34

3.10 INSTALL CAP (ITEM 135) TO THE FRONT BEZEL BY PRESSING INTO THE HOLE FROM THE OUTSIDE.

3.11 INSTALL WINDOWS INTO FRONT BEZEL FOR LCD (ITEM 28), POWER (ITEM 30) AND EXPOSURE TIME DISPLAY (ITEM 29) USING ADHESIVE STRIPS (ITEM 139 FOR LCD, ITEM 140 FOR POWER, AND ITEM 141 FOR EXPOSURE. ADD FOUR DROPS OF (ITEM 169) ON CORNERS OF WINDOWS AND CURE AT 70°F ±5°F FOR 24 HOURS.


STEP THREE 3.12 - 3.18
FRONT PANEL ASSEMBLY
3.12 INSTALL ELASTOMER KEYPAD (ITEM 37) IN THE INSIDE OF THE FRONT PANEL.
3.13 INSTALL GROUND CABLE (ITEM 158) NEAR L2 ON FRONT PANEL PCB, USING M3 NUT (ITEM 108) AND WASHER (ITEM 34). INSTALL W28 CABLE (ITEM 37) TO A7J1 CONNECTOR.
3.14 PEEL OFF PLASTIC WRAPPER FROM LCD DISPLAY WINDOW AND INSTALL DISPLAY PCB (ITEM 32) USING EIGHT (8) M3X8 SCREWS (ITEM 33) AND M3 STAR WASHERS (ITEM 34).
3.15 INSTALL POWER DISPLAY PCB (ITEM 113) USING FOUR (4) EACH M3X8 SCREWS (ITEM 33) AND STAR WASHERS (ITEM 34).
3.16 INSTALL FRONT PANEL PCB (ITEM 35) ON TOP OF DISPLAY PCB USING (32) EACH M4X8 SCREWS (ITEM 19) AND STAR WASHERS (ITEM 22). AND INSTALL GROUND CABLE (ITEM 9) ON THE MOUNTING HOLE NEAR KEYSWITCH.
3.17 INSTALL CABLES PER FOLLOWING DIAGRAM:
ITEM DESC FROM DESIGNATION TO DESIGNATION
37 W28 LCD DISPLAY PCB A7J1 FRONT PANEL PCB A4J2
38 W27 KEY PAD PCB 6J1 FRONT PANEL PCB A4J6
39 W29 EXPOSURE TIME PCB A23J1 FRONT PANEL PCB A4J9
16 W26 KEY SWITCH ... FRONT PANEL PCB A4J7
15 W24 ALARM VOLUME POT ... FRONT PANEL PCB A4J8
25 W25 POWER POT ... POWER DISPLAY PCB J3
27 W23 PANIC SWITCH ... POWER DISPLAY PCB J2
44 W30 POWER DISPLAY A5J1 FRONT PANEL PCB A4J5
542-0000-XXX
542-0000-XXX AE
SHEET 7 OF 19
4X
8X
A1
A2
A3
A4
A5
A6
A7
A23
A4J2
A4J5
A4J6
A4J7
A4J8
A4J9

STEP FOUR 4.0 - 4.10

NOTE: PERFORM AIMING DIODE (ITEM 49) BEAM TEST FOR OUTPUT POWER, SPOT SIZE AND OPTICAL FEEDBACK TIMING PER MTP 907-5420-012, USING TEST FIXTURE 995-5420-023.

OPTICAL BLOCK ASSEMBLY

4.0 PLACE THIN LAYER OF RTV LOCKTITE 5145 ON THE BODY OF AIMING BEAM DIODE (ITEM 49) AS SHOWN.

4.1 INSTALL AIMING BEAM DIODE IN DIODE AIMING SLEEVE (ITEM 50).

4.2 SPREAD EXCESS RTV AROUND THE TOP OF THE DIODE.

4.3 CURE RTV FOR 24 HOURS AT ROOM TEMPERATURE.

4.4 AFTER RTV IS CURED, INSTALL DIODE AIMING BEAM ASSEMBLY INTO THE OPTICAL BLOCK (ITEM 83). MAKE SURE DIODE IS TURNED SO WIRES ARE PROPERLY ALIGNED TO ALLOW ROUTING THROUGH THE SLOT IN THE TOP OF THE OPTICAL BLOCK AND DIODE IS PUSHED ALL THE WAY TO THE BOTTOM OF HOLE, AND SECURE USING TWO (2) SETSCREWS (ITEM 52).

4.5 PLACE ALL OPTICAL MOUNTS AND PLATES IN ULTRASONIC CLEANER AND CLEAN USING ALCOHOL. START BY FILLING TANK WITH REGULAR GRADE ALCOHOL. PLACE PARTS IN TANK AND TURN ON ULTRASOUND FOR APPROX. 10 MIN. WHEN ALL PARTS ARE DONE PER JOB. DRAIN TANK AND DISPOSE OF ALCOHOL APPROPRIATLY.

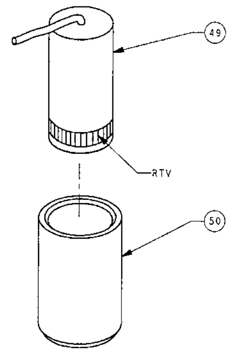
4.6 GLUE OPTIC (ITEM 53) TO MOUNT (ITEM 54) USING 3 DROPS OF ADHESIVE 3M DP-420 (ITEM 116) APPROXIMATELY 120° APART, AS SHOWN, AND CURE AT 70°F±5°F FOR 24 HOURS.

4.7 INSTALL THREE (3) SETSCREWS (ITEM 55) INTO AIM BEAM BASE (ITEM 51).

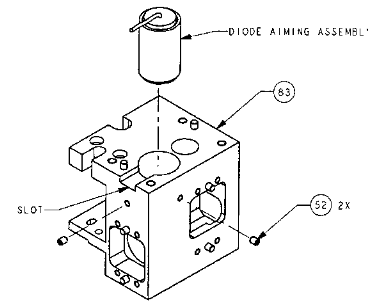
4.8 ASSEMBLE MIRROR ASSEMBLY TO AIM BEAM BASE USING TWO (2) EACH SCREWS (ITEM 56) AND 26 EACH WASHERS (ITEM 57).

4.9 USING GAUGE, ALCON P/N: 995-5420-004, SET DISTANCE BETWEEN THE TWO MOUNTS AND TIGHTEN HARDWARE.

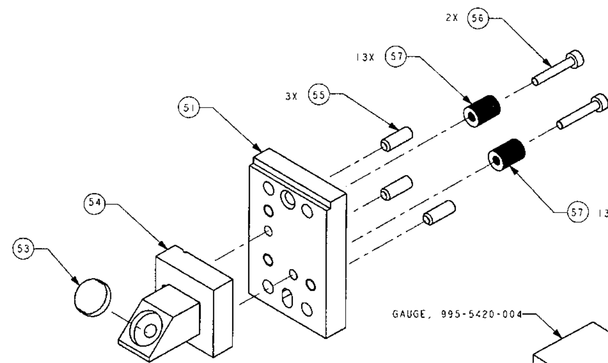
4.10 REPEAT STEPS 4.6-4.9 TO CREATE A DUPLICATE ASSEMBLY.



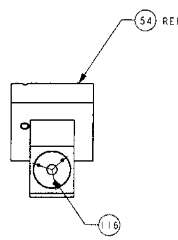
STEPS 4.0 - 4.3



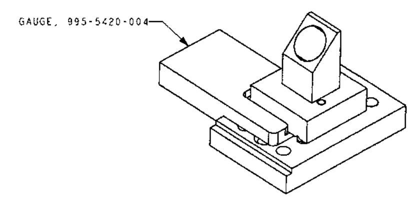
STEP 4.4
SCALE: 1/1



2 REQ'D

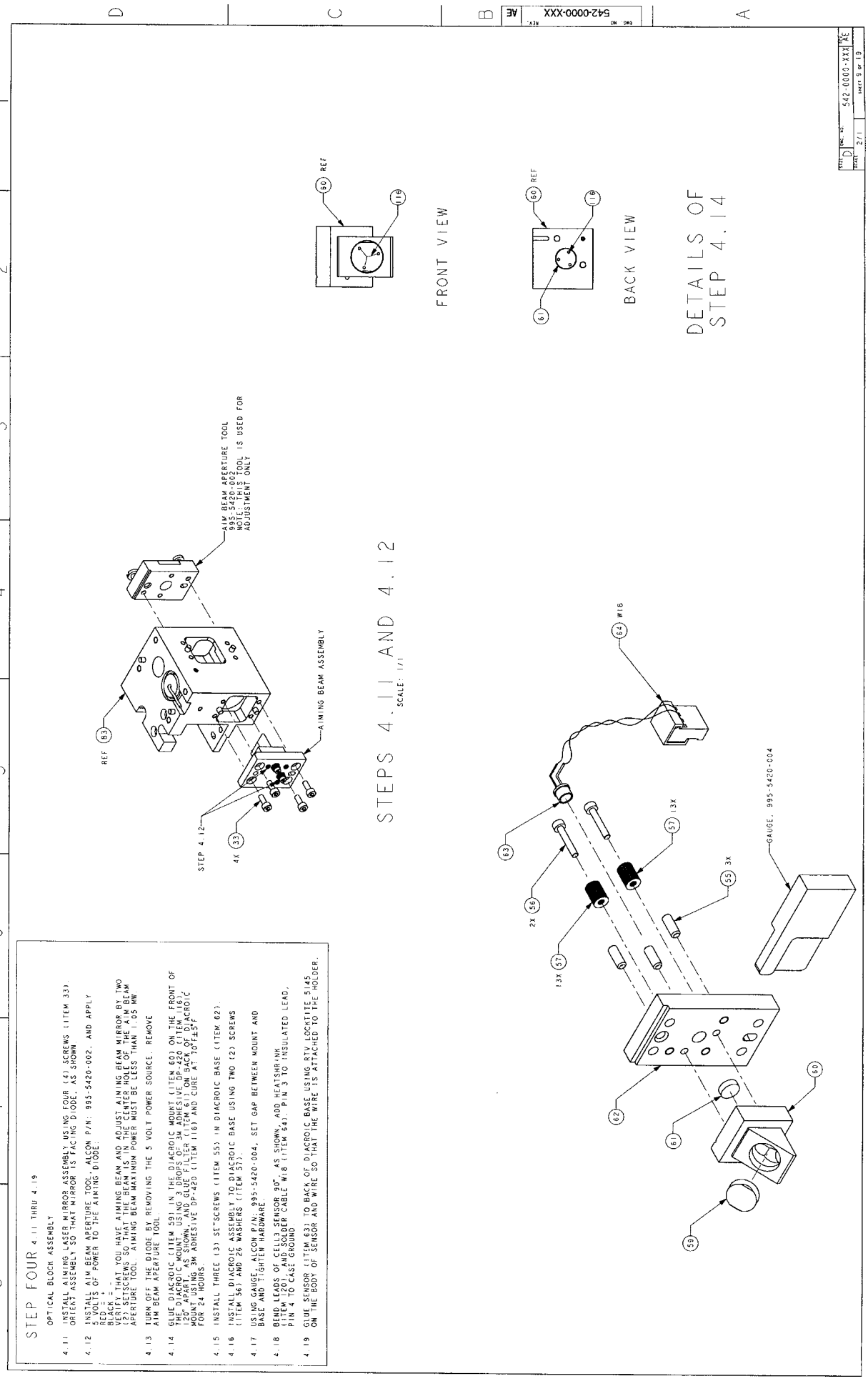


DETAIL OF STEP 4.6



DETAIL OF STEP 4.9

SIZE	DWG. NO.	REV
D	542-0000-XXX	AE
SCALE 2/1	SHEET 8 OF 19	


STEP FOUR 4.11 THRU 4.19
OPTICAL BLOCK ASSEMBLY
4.11 INSTALL AIMING LASER MIRROR ASSEMBLY USING FOUR (4) SCREWS (ITEM 33) ORIENT ASSEMBLY SO THAT MIRROR IS FACING DIODE, AS SHOWN
4.12 INSTALL AIM BEAM APERTURE TOOL, ALCON P/N: 995-5420-002, AND APPLY 5 VOLTS OF POWER TO THE AIMING DIODE.
RED = +
BLACK = -
VERIFY THAT YOU HAVE AIMING BEAM AND ADJUST AIMING BEAM MIRROR BY TWO (2) SETSCREWS SO THAT THE BEAM IS IN THE CENTER HOLE OF THE AIM BEAM APERTURE TOOL. AIMING BEAM MAXIMUM POWER MUST BE LESS THAN 1.05 MW
4.13 TURN OFF THE DIODE BY REMOVING THE 5 VOLT POWER SOURCE. REMOVE AIM BEAM APERTURE TOOL
4.14 GLUE DIACROIC (ITEM 58) IN THE DIACROIC MOUNT (ITEM 62) ON THE FRONT OF THE DIACROIC MOUNT USING TWO DROPS OF ADHESIVE 120° APART, AS SHOWN, AND GLUE FILTER (ITEM 61) ON BACK OF DIACROIC MOUNT USING 3M ADHESIVE DP-420 (ITEM 116) AND CURE AT 70°F±5°F FOR 24 HOURS.
4.15 INSTALL THREE (3) SET SCREWS (ITEM 55) IN DIACROIC BASE (ITEM 62).
4.16 INSTALL DIACROIC ASSEMBLY TO DIACROIC BASE USING TWO (2) SCREWS (ITEM 56) AND 26 WASHERS (ITEM 57).
4.17 USING GAUGE, ALCON P/N: 995-5420-004, SET GAP BETWEEN MOUNT AND BASE AND TIGHTEN HARDWARE.
4.18 BEND LEADS OF CELL3 SENSOR 90°, AS SHOWN, ADD HEATSHRINK (ITEM 120), AND SOLDER CABLE W18 (ITEM 64) PIN 3 TO INSULATED LEAD, PIN 4 TO CASE GROUND.
4.19 GLUE SENSOR (ITEM 63) TO BACK OF DIACROIC BASE USING RTV LOCKTITE 5145 ON THE BODY OF SENSOR AND WIRE SO THAT THE WIRE IS ATTACHED TO THE HOLDER.
STEPS 4.11 AND 4.12
SCALE: 1/1
AIM BEAM APERTURE TOOL
995-5420-002
NOTE: THIS TOOL IS USED FOR ADJUSTMENT ONLY
AIMING BEAM ASSEMBLY
REF
STEP 4.12
4X
FRONT VIEW
BACK VIEW
DETAILS OF STEP 4.14
GAUGE, 995-5420-004
542-0000-XXX
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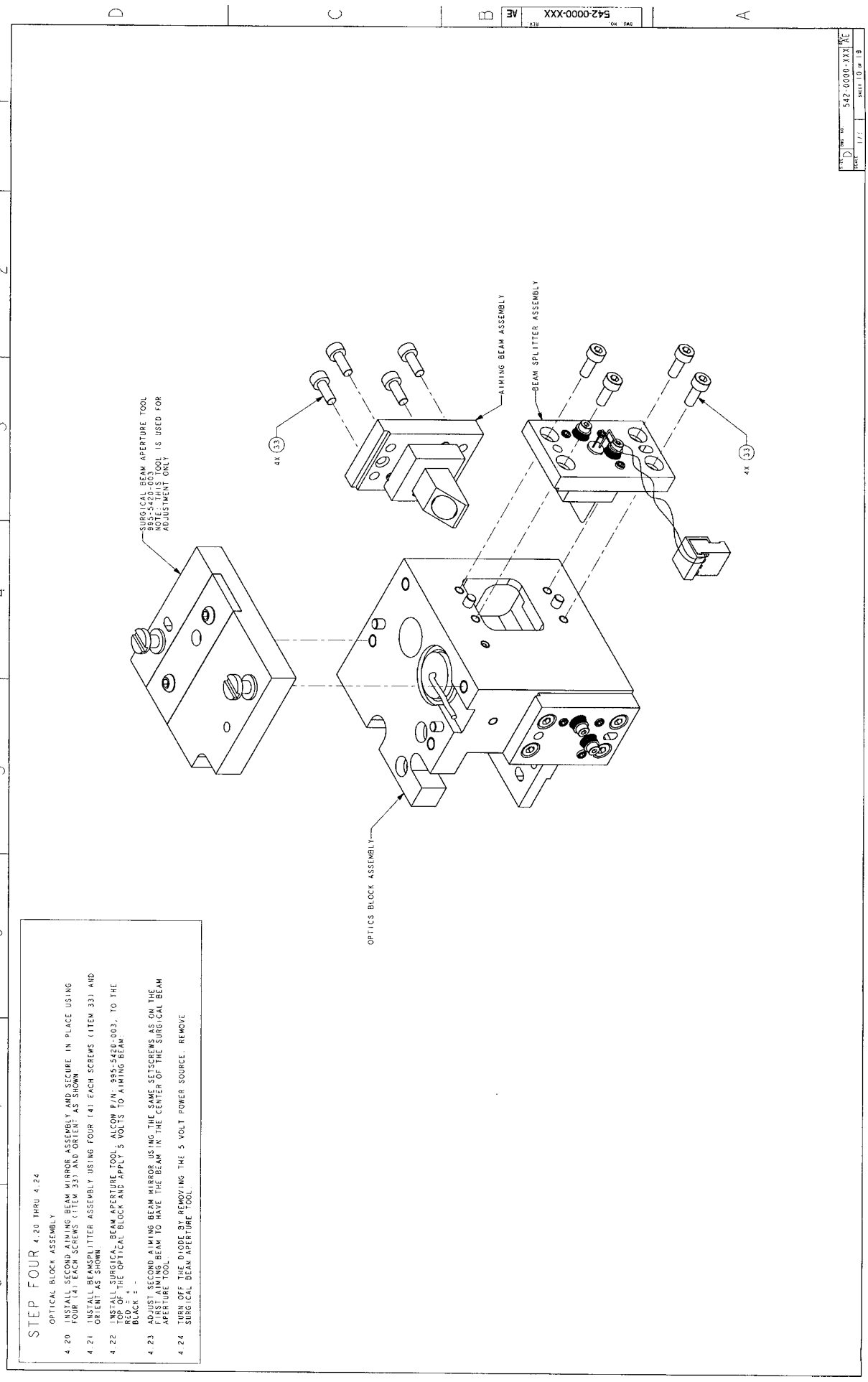
SHEET 9 OF 19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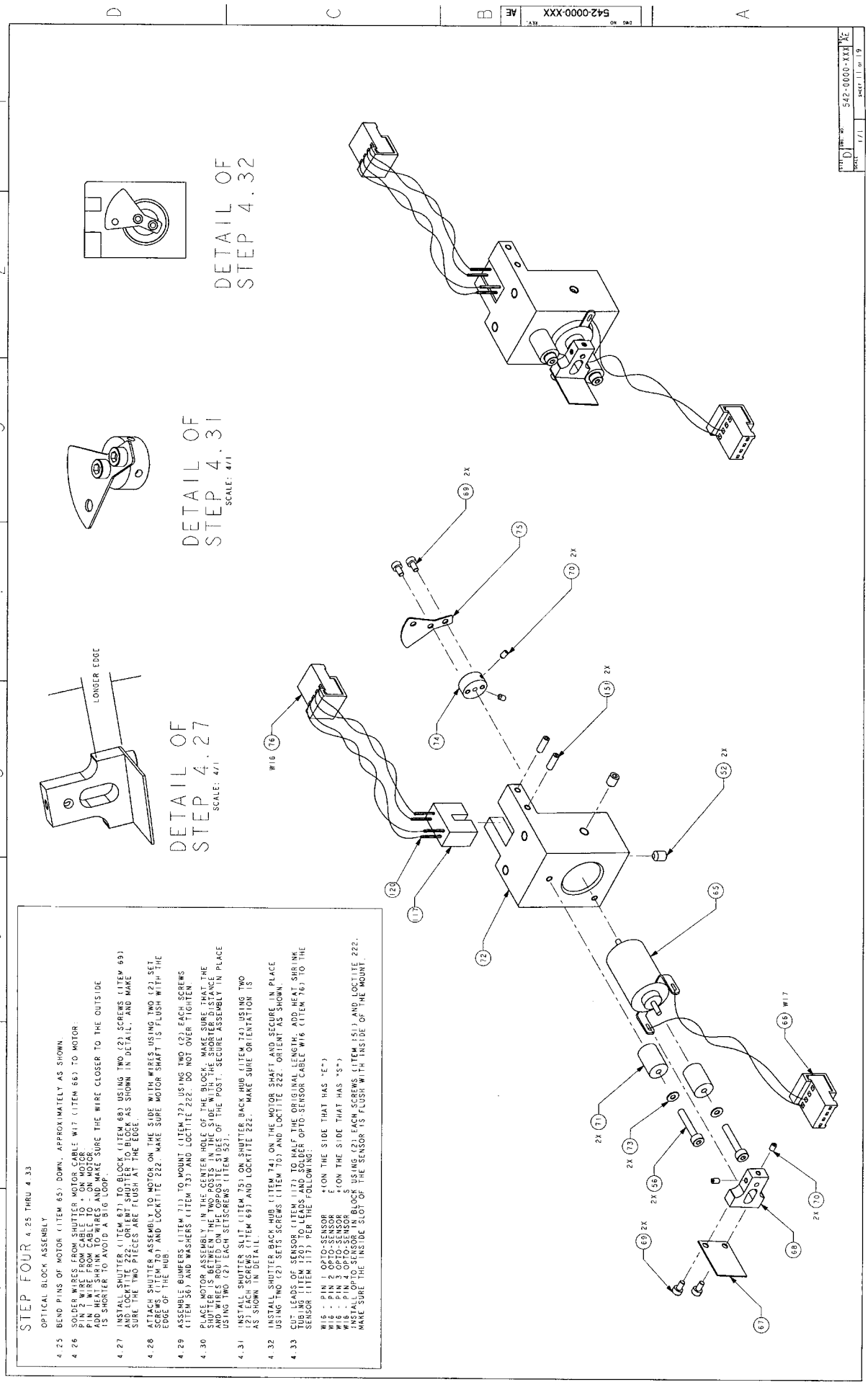
SHEET 1 OF 1
SIZE D
SCALE 1/1
SURGICAL BEAM APERTURE TOOL
995-5420-003
NOTE: THIS TOOL IS USED FOR
ADJUSTMENT ONLY
AIMING BEAM ASSEMBLY
BEAM SPLITTER ASSEMBLY
4X (33)
4X (33)
OPTICS BLOCK ASSEMBLY
STEP FOUR 4.20 THRU 4.24
OPTICAL BLOCK ASSEMBLY
4.20 INSTALL SECOND AIMING BEAM MIRROR ASSEMBLY AND SECURE IN PLACE USING FOUR (4) EACH SCREWS (ITEM 331) AND ORIENT AS SHOWN.
4.21 INSTALL BEAMSPLITTER ASSEMBLY USING FOUR (4) EACH SCREWS (ITEM 331) AND ORIENT AS SHOWN.
4.22 INSTALL SURGICAL BEAM APERTURE TOOL, ALCON P/N: 995-5420-003, TO THE TOP OF THE OPTICAL BLOCK AND APPLY 5 VOLTS TO AIMING BEAM.
RED = +
BLACK = -
4.23 ADJUST SECOND AIMING BEAM MIRROR USING THE SAME SETSCREWS AS ON THE FIRST AIMING BEAM TO HAVE THE BEAM IN THE CENTER OF THE SURGICAL BEAM APERTURE TOOL.
4.24 TURN OFF THE DIODE BY REMOVING THE 5 VOLT POWER SOURCE. REMOVE SURGICAL BEAM APERTURE TOOL.


STEP FOUR 4.25 THRU 4.33
OPTICAL BLOCK ASSEMBLY
4.25 BEND PINS OF MOTOR (ITEM 65) DOWN, APPROXIMATELY AS SHOWN.
4.26 SOLDER WIRES FROM SHUTTER MOTOR CABLE W17 (ITEM 66) TO MOTOR:
PIN 1 WIRE FROM CABLE TO + ON MOTOR.
PIN 2 WIRE FROM CABLE TO - ON MOTOR.
ADD HEAT SHRINK TO WIRES AND MAKE SURE THE WIRE CLOSER TO THE OUTSIDE IS SHORTER TO AVOID A BIG LOOP.
4.27 INSTALL SHUTTER (ITEM 67) TO BLOCK (ITEM 68) USING TWO (2) SCREWS (ITEM 69) AND LOCKTITE 222. ORIENT SHUTTER TO BLOCK AS SHOWN IN DETAIL, AND MAKE SURE THE TWO PIECES ARE FLUSH AT THE EDGE.
4.28 ATTACH SHUTTER ASSEMBLY TO MOTOR ON THE SIDE WITH WIRES USING TWO (2) SET SCREWS (ITEM 70) AND LOCKTITE 222. MAKE SURE MOTOR SHAFT IS FLUSH WITH THE EDGE OF THE HUB.
4.29 ASSEMBLE BUMPERS (ITEM 71) TO MOUNT (ITEM 72) USING TWO (2) EACH SCREWS (ITEM 56) AND WASHERS (ITEM 73) AND LOCTITE 222. DO NOT OVER TIGHTEN.
4.30 PLACE MOTOR ASSEMBLY IN THE CENTER HOLE OF THE BLOCK. MAKE SURE THAT THE SHUTTER IS BETWEEN THE TWO POSTS IN THE SIDE WITH THE SHORTER DISTANCE AND WIRES ROUTED ON THE OPPOSITE SIDES OF THE POST. SECURE ASSEMBLY IN PLACE USING TWO (2) EACH SETSCREWS (ITEM 521).
4.31 INSTALL SHUTTER SLIT (ITEM 75) ON SHUTTER BACK HUB (ITEM 74) USING TWO (2) EACH SCREWS (ITEM 69) AND LOCKTITE 222. MAKE SURE ORIENTATION IS AS SHOWN IN DETAIL.
4.32 INSTALL SHUTTER BACK HUB (ITEM 74) ON THE MOTOR SHAFT AND SECURE IN PLACE USING TWO (2) SETS SCREWS (ITEM 70) AND LOCTITE 222. ORIENT AS SHOWN.
4.33 CUT LEADS OF SENSOR (ITEM 117) TO HALF THE ORIGINAL LENGTH. ADD HEAT SHRINK TUBING (ITEM 120) TO LEADS AND SOLDER OPTO SENSOR CABLE W16 (ITEM 76) TO THE SENSOR (ITEM 117) PER THE FOLLOWING:
W16 - PIN 1 OPTO-SENSOR +(ON THE SIDE THAT HAS "E")
W16 - PIN 2 OPTO-SENSOR E
W16 - PIN 3 OPTO-SENSOR +(ON THE SIDE THAT HAS "S")
INSTALL OPTO SENSOR IN BLOCK USING (2) EACH SCREWS (ITEM 15L) AND LOCTITE 222. MAKE SURE THE INSIDE SLOT OF THE SENSOR IS FLUSH WITH INSIDE OF THE MOUNT
DETAIL OF STEP 4.27
SCALE: 4/1
LONGER EDGE
DETAIL OF STEP 4.31
SCALE: 4/1
DETAIL OF STEP 4.32
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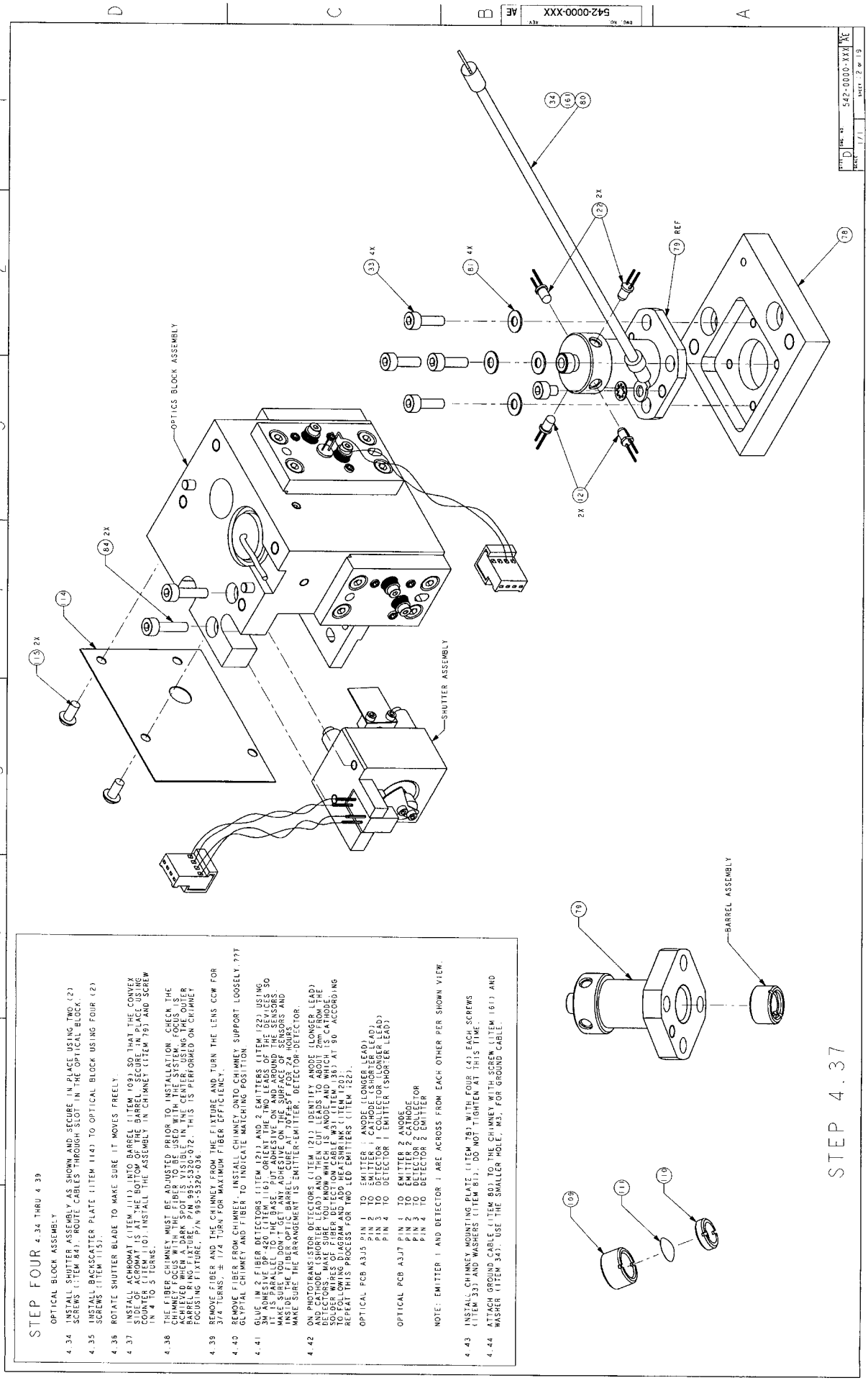
SHEET 11 OF 19
SCALE: 1/1
W16
W17
2X


STEP FOUR 4.34 THRU 4.39
OPTICAL BLOCK ASSEMBLY
4.34 INSTALL SHUTTER ASSEMBLY AS SHOWN AND SECURE IN PLACE USING TWO (2) SCREWS (ITEM 84). ROUTE CABLES THROUGH SLOT IN THE OPTICAL BLOCK.
4.35 INSTALL BACKSCATTER PLATE (ITEM 114) TO OPTICAL BLOCK USING FOUR (2) SCREWS (ITEM 115).
4.36 ROTATE SHUTTER BLADE TO MAKE SURE IT MOVES FREELY.
4.37 INSTALL ACHROMAT (ITEM 109) SO THAT THE CONVEX SURFACE IS FACING OUT. INSTALL BARREL (ITEM 110) INTO COUNTER (ITEM 110). INSTALL THE ASSEMBLY IN CHIMNEY (ITEM 79) AND SCREW IN 4 TO 5 TURNS.
4.38 THE FIBER CHIMNEY MUST BE ADJUSTED PRIOR TO INSTALLATION. CHECK THE CHIMNEY FOCUS WITH THE FIBER TO BE USED WITH THE SYSTEM. FOCUS IS ACHIEVED WHEN A DARK SPOT IS VISIBLE IN THE CENTER. USING THE OUTER BARREL RING FIXTURE, P/N 995-5320-072 THIS IS PERFORMED ON CHIMNEY FOCUSING FIXTURE, P/N 995-5320-036.
4.39 REMOVE FIBER AND THE CHIMNEY FROM THE FIXTURE AND TURN THE LENS CCW FOR 3/4 TURNS, ± 1/4 TURN FOR MAXIMUM FIBER EFFICIENCY.
4.40 REMOVE FIBER FROM CHIMNEY. INSTALL CHIMNEY ONTO CHIMNEY SUPPORT LOOSELY. ??T GLYPTAL CHIMNEY AND FIBER TO INDICATE MATCHING POSITION
4.41 GLUE (M 2 FIBER DETECTORS (ITEM 121) AND 2 EMITTERS (ITEM 122) USING 3M ADHESIVE DP-420 (ITEM 161). ORIENT THE TWO LEADS OF THE DEVICES SO IT IS PARALLEL TO THE BASE. PUT ADHESIVE ON AND AROUND THE SENSORS MAKE SURE YOU DON'T GET ANY ADHESIVE ON THE SURFACE OF SENSORS AND MAKE SURE THE ARRANGEMENT IS EMITTER-EMITTER-DETECTOR-DETECTOR.
4.42 ON PHOTOTRANSISTOR DETECTORS (ITEM 121) IDENTIFY ANODE (LONGER LEAD) AND CATHODE (SHORTER LEAD). ON EMITTERS (ITEM 122) IDENTIFY THE DETECTORS. MAKE SURE YOU KNOW WHICH IS ANODE AND WHICH IS CATHODE. SOLDER WIRES OF FIBER DETECTION CABLE W31 (ITEM 136) AT 90 ACCORDING TO FOLLOWING DIAGRAM AND ADD HEATSHRINK (ITEM 120).
REPEAT THIS PROCESS FOR TWO LED EMITTERS (ITEM 122).
OPTICAL PCB A3J5 PIN 1 TO EMITTER 1 ANODE (LONGER LEAD)
PIN 2 TO EMITTER 1 CATHODE (SHORTER LEAD)
PIN 3 TO DETECTOR 1 COLLECTOR (LONGER LEAD)
PIN 4 TO DETECTOR 1 EMITTER (SHORTER LEAD)
OPTICAL PCB A3J7 PIN 1 TO EMITTER 2 ANODE
PIN 2 TO EMITTER 2 CATHODE
PIN 3 TO DETECTOR 2 COLLECTOR
PIN 4 TO DETECTOR 2 EMITTER
NOTE: EMITTER 1 AND DETECTOR 1 ARE ACROSS FROM EACH OTHER PER SHOWN VIEW.
4.43 INSTALL CHIMNEY MOUNTING PLATE (ITEM 78) WITH FOUR (4) EACH SCREWS (ITEM 33) AND WASHERS (ITEM 81). DO NOT TIGHTEN AT THIS TIME.
4.44 ATTACH GROUND CABLE (ITEM 80) TO THE CHIMNEY WITH SCREW (ITEM 161) AND WASHER (ITEM 34). USE THE SMALLER HOLE, #8, FOR GROUND CABLE.
STEP 4.37
OPTICS BLOCK ASSEMBLY
SHUTTER ASSEMBLY
BARREL ASSEMBLY
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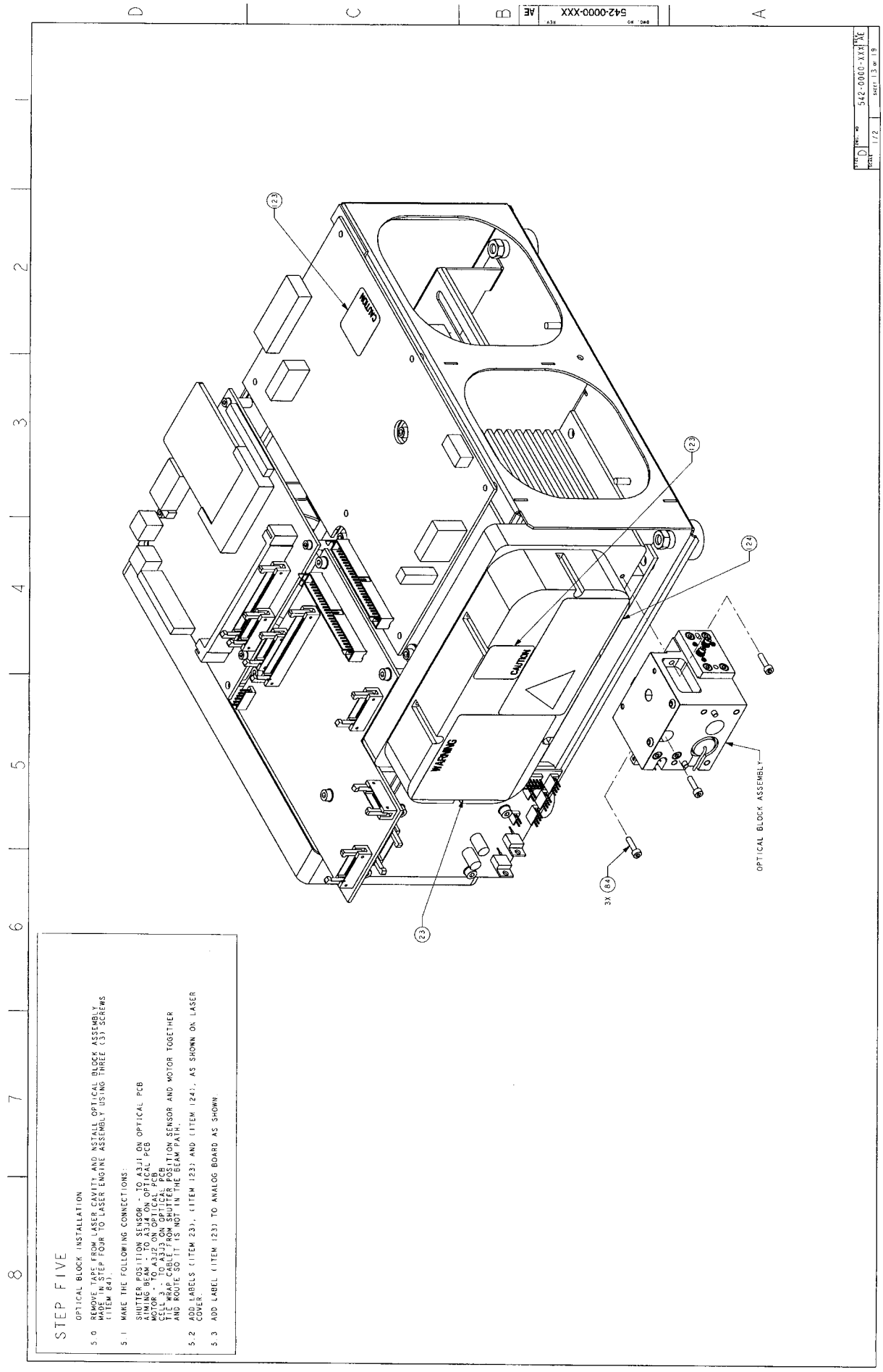
SHEET 2 OF 19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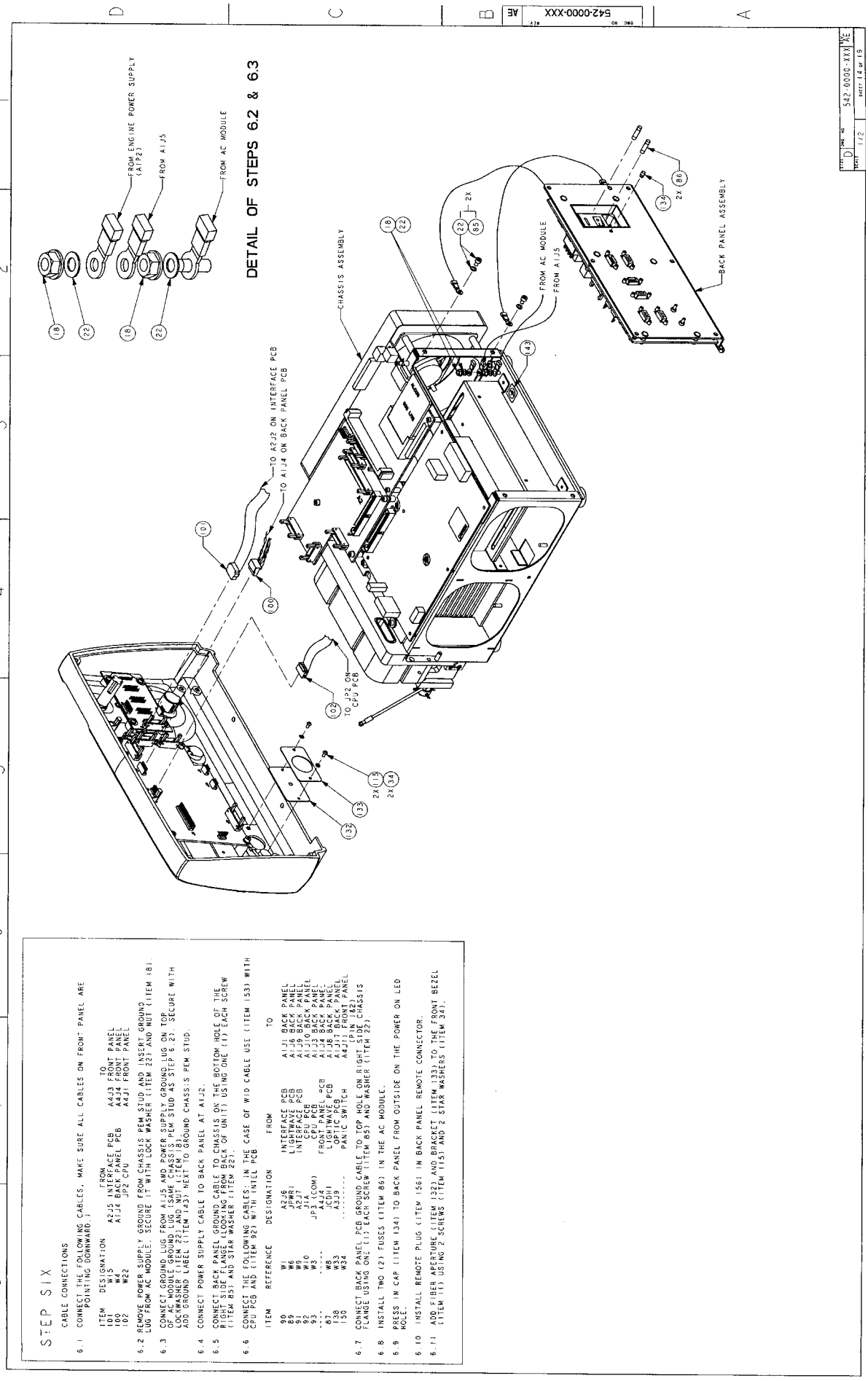
SHEET 1 OF 19
1/2
STEP FIVE
OPTICAL BLOCK INSTALLATION
5.0 REMOVE TAPE FROM LASER CAVITY AND INSTALL OPTICAL BLOCK ASSEMBLY MADE IN STEP FOUR TO LASER ENGINE ASSEMBLY USING THREE (3X) SCREWS (ITEM 84).
5.1 MAKE THE FOLLOWING CONNECTIONS:
SHUTTER POSITION SENSOR - TO A3J1 ON OPTICAL PCB
AIMING BEAM - TO A3J4 ON OPTICAL PCB
MOTOR - TO A3J2 ON OPTICAL PCB
CELL WAR - TO A3J3 ON OPTICAL PCB
TIE WRAP CABLES FROM SHUTTER POSITION SENSOR AND MOTOR TOGETHER AND ROUTE SO IT IS NOT IN THE BEAM PATH.
5.2 ADD LABELS (ITEM 23), (ITEM 123) AND (ITEM 124), AS SHOWN ON LASER COVER.
5.3 ADD LABEL (ITEM 123) TO ANALOG BOARD AS SHOWN
CAUTION
WARNING
CAUTION
OPTICAL BLOCK ASSEMBLY
3X


STEP SIX
CABLE CONNECTIONS
6.1 CONNECT THE FOLLOWING CABLES, MAKE SURE ALL CABLES ON FRONT PANEL ARE POINTING DOWNWARD.)
ITEM DESIGNATION FROM TO
101 W15 A2J5 INTERFACE PCB A4J3 FRONT PANEL
100 W4 A1J4 BACK PANEL PCB A4J4 FRONT PANEL
102 W22 JP2 CPU A4J1 FRONT PANEL
6.2 REMOVE POWER SUPPLY GROUND FROM CHASSIS PEM STUD AND INSERT GROUND LUG FROM AC MODULE. SECURE (1) WITH LOCK WASHER (ITEM 22) AND NUT (ITEM 18)
6.3 CONNECT GROUND LUG FROM A1J5 AND POWER SUPPLY GROUND LUG ON TOP OF AC MODULE GROUND LUG (SAME CHASSIS PEM STUD AS STEP 6.2). SECURE WITH LOCKWASHER (ITEM 22) AND NUT (ITEM 18). ADD GROUND LABEL (ITEM 143) NEXT TO GROUND CHASSIS PEM STUD.
6.4 CONNECT POWER SUPPLY CABLE TO BACK PANEL AT A1J2.
6.5 CONNECT BACK PANEL GROUND CABLE TO CHASSIS ON THE BOTTOM HOLE OF THE RIGHT SIDE FLANGE (LOOKING FROM BACK OF UNIT) USING ONE (1) EACH SCREW (ITEM 85) AND STAR WASHER (ITEM 22).
6.6 CONNECT THE FOLLOWING CABLES: IN THE CASE OF W10 CABLE USE (ITEM 153) WITH CPU PCB AND (ITEM 92) WITH INTEL PCB
ITEM REFERENCE DESIGNATION FROM TO
90 W1 A2J6 INTERFACE PCB A1J1 BACK PANEL
89 W6 JPWR1 LIGHTWAVE PCB A1J6 BACK PANEL
91 W9 J1 INTERFACE PCB A1J9 BACK PANEL
92 W10 J1A CPU PCB A1J10 BACK PANEL
93 W3 JP3 (COM) CPU PCB A1J3 BACK PANEL
87 W8 A4J4 FRONT PANEL PCB A1J4 BACK PANEL
138 W33 A3J1 LIGHTWAVE PCB A1J7 BACK PANEL
150 W34 ..... OPTIC PCB A4J11 FRONT PANEL
6.7 CONNECT BACK PANEL PCB GROUND CABLE TO TOP HOLE ON RIGHT SIDE FLANGE USING ONE (1) EACH SCREW (ITEM 85) AND WASHER (ITEM 22). (PIN 182 CHASSIS
6.8 INSTALL TWO (2) FUSES (ITEM 86) IN THE AC MODULE.
6.9 PRESS IN CAP (ITEM 134) TO BACK PANEL FROM OUTSIDE ON THE POWER ON LED HOLE.
6.10 INSTALL REMOTE PLUG (ITEM 156) IN BACK PANEL REMOTE CONNECTOR.
6.11 ADD FIBER APERTURE (ITEM 132) AND BRACKET (ITEM 133) TO THE FRONT BEZEL (ITEM 19) USING 2 SCREWS (ITEM 145) AND 2 STAR WASHERS (ITEM 147).
DETAIL OF STEPS 6.2 & 6.3
FROM ENGINE POWER SUPPLY (A1P2)
FROM A1J5
FROM AC MODULE
CHASSIS ASSEMBLY
TO A2J2 ON INTERFACE PCB
TO A1J4 ON BACK PANEL PCB
TO JP2 ON CPU PCB
FROM AC MODULE
FROM A1J5
BACK PANEL ASSEMBLY
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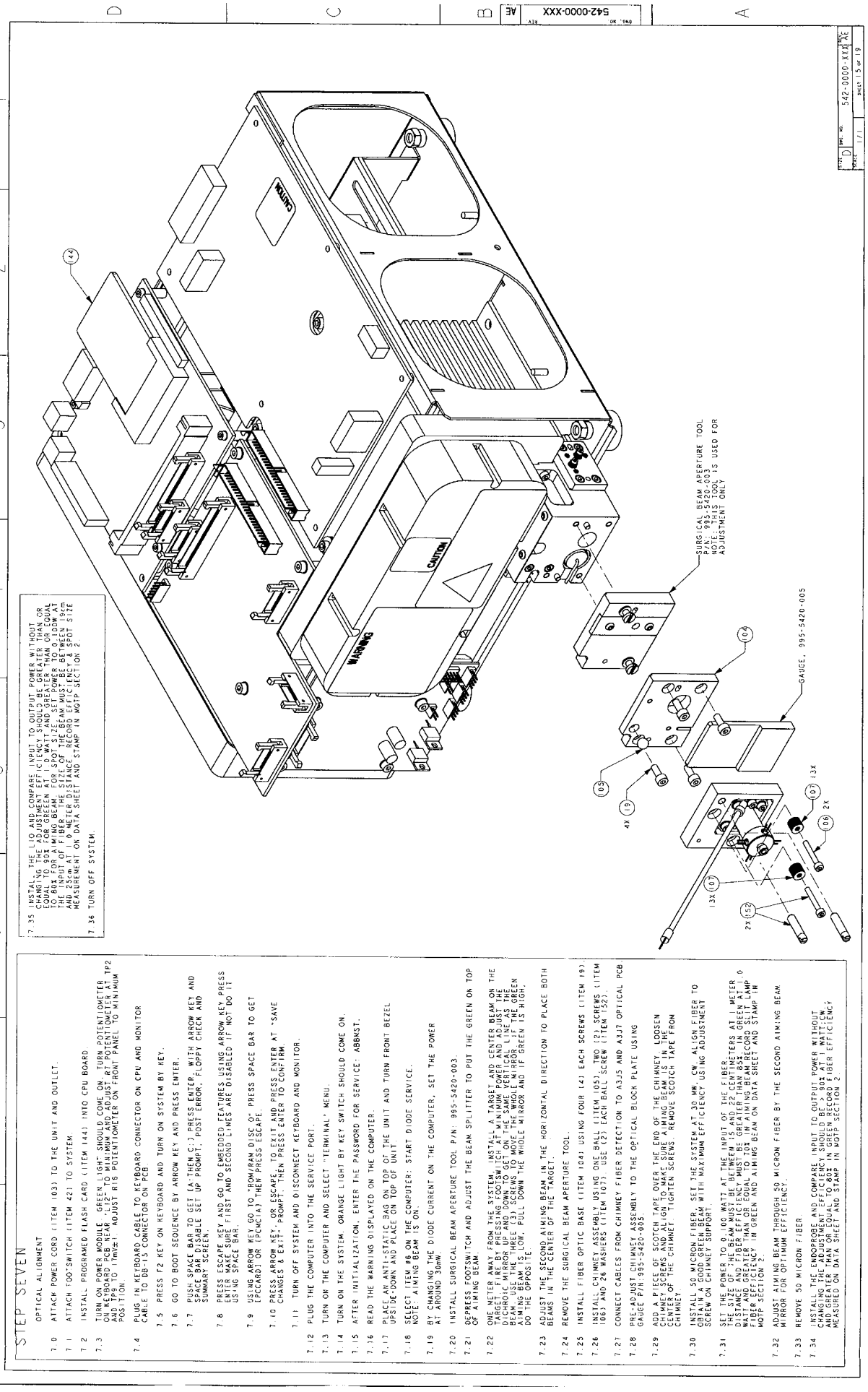
SHEET 1 OF 1
SIZE D
SHEET 1/2


STEP SEVEN
OPTICAL ALIGNMENT
7.0 ATTACH POWER CORD (ITEM 103) TO THE UNIT AND OUTLET.
7.1 ATTACH FOOTSWITCH (ITEM 421) TO SYSTEM.
7.2 INSTALL PROGRAMED FLASH CARD (ITEM 1441) INTO CPU BOARD
7.3 TURN ON POWER MODULE. GREEN LIGHT SHOULD COME ON. TURN POTENTIOMETER ON KEYBOARD PCB NEAR 1.12" TO MINIMUM AND ADJUST R7 POTENTIOMETER AT TP2 AND TP3 TO 1mV±1. ADJUST R16 POTENTIOMETER ON FRONT PANEL TO MINIMUM POSITION.
7.4 PLUG IN KEYBOARD CABLE TO KEYBOARD CONNECTOR ON CPU AND MONITOR CABLE TO DB-15 CONNECTOR ON PCB
7.5 PRESS F2 KEY ON KEYBOARD AND TURN ON SYSTEM BY KEY.
7.6 GO TO BOOT SEQUENCE BY ARROW KEY AND PRESS ENTER.
7.7 PUSH SPACE BAR TO GET [A:THEN C:] PRESS ENTER, WITH ARROW KEY AND SPACE BAR DISABLE SET UP PROMPT, POST ERROR, FLOPPY CHECK AND SUMMARY SCREEN.
7.8 PRESS ESCAPE KEY AND GO TO EMBEDDED FEATURES USING ARROW KEY PRESS ENTER MAKE SURE FIRST AND SECOND LINES ARE DISABLED IF NOT DO IT USING SPACE BAR.
7.9 USING ARROW KEY GO TO "ROM/RAM DISC 0" PRESS SPACE BAR TO GET [PCCARD] OR [PCMCIA] THEN PRESS ESCAPE.
7.10 PRESS ARROW KEY, OR ESCAPE, TO EXIT AND PRESS ENTER AT "SAVE CHANGES & EXIT?" PROMPT. THEN PRESS ENTER TO CONFIRM
7.11 TURN OFF SYSTEM AND DISCONNECT KEYBOARD AND MONITOR.
7.12 PLUG THE COMPUTER INTO THE SERVICE PORT.
7.13 TURN ON THE COMPUTER AND SELECT "TERMINAL" MENU.
7.14 TURN ON THE SYSTEM. ORANGE LIGHT BY KEY SWITCH SHOULD COME ON.
7.15 AFTER INITIALIZATION, ENTER THE PASSWORD FOR SERVICE: ABBMST.
7.16 READ THE WARNING DISPLAYED ON THE COMPUTER.
7.17 PLACE AN ANTI-STATIC BAG ON TOP OF THE UNIT AND TURN FRONT BEZEL UPSIDE DOWN AND PLACE ON TOP OF UNIT.
7.18 SELECT ITEM #6 ON THE COMPUTER: START DIODE SERVICE.
NOTE: AIMING BEAM IS ON.
7.19 BY CHANGING THE DIODE CURRENT ON THE COMPUTER, SET THE POWER AT AROUND 30mW
7.20 INSTALL SURGICAL BEAM APERTURE TOOL P/N: 995-5420-003.
7.21 DEPRESS FOOTSWITCH AND ADJUST THE BEAM SPLITTER TO PUT THE GREEN ON TOP OF AIMING BEAM.
7.22 ONE METER AWAY FROM THE SYSTEM, INSTALL A TARGET AND CENTER BEAM ON THE TARGET. PRESS FOOTSWITCH AND ADJUST THE POWER TO MINIMUM AND ADJUST THE DIAGNOSTIC MIRROR SO THAT THE GREEN AIMING BEAM IS ON THE TARGET. USE THE THREE (3) SCREWS TO MOVE THE WHOLE MIRROR. IF THE GREEN AIMING BEAM IS LOW, PULL DOWN THE WHOLE MIRROR AND IF GREEN IS HIGH, DO THE OPPOSITE.
7.23 ADJUST THE SECOND AIMING BEAM IN THE HORIZONTAL DIRECTION TO PLACE BOTH BEAMS IN THE CENTER OF THE TARGET.
7.24 REMOVE THE SURGICAL BEAM APERTURE TOOL.
7.25 INSTALL FIBER OPTIC BASE (ITEM 1041) USING FOUR (4) EACH SCREWS (ITEM 191).
7.26 INSTALL CHIMNEY ASSEMBLY USING ONE BALL (ITEM 105), TWO (2) SCREWS (ITEM 106) AND 26 WASHERS (ITEM 107). USE (2) EACH BALL SCREW (ITEM 152).
7.27 CONNECT CABLES FROM CHIMNEY FIBER DETECTION TO A3J5 AND A3J7 OPTICAL PCB
7.28 PRE-ADJUST CHIMNEY ASSEMBLY TO THE OPTICAL BLOCK PLATE USING GAUGE P/N 995-5420-005
7.29 ADD A PIECE OF SCOTCH TAPE OVER THE END OF THE CHIMNEY. LOOSEN CHIMNEY SCREWS AND ALIGN TO MAKE SURE AIMING BEAM IS IN THE CENTER OF THE CHIMNEY. TIGHTEN SCREWS. REMOVE SCOTCH TAPE FROM CHIMNEY.
7.30 INSTALL 50 MICRON FIBER. SET THE SYSTEM AT 30 MW. CW. ALIGN FIBER TO OBTAIN A GOOD GREEN BEAM WITH MAXIMUM EFFICIENCY USING ADJUSTMENT SCREW ON CHIMNEY SUPPORT.
7.31 SET THE POWER TO 0.100 WATT AT THE INPUT OF THE FIBER. THE SIZE OF THE BEAM MUST BE BETWEEN 1.5 AND 2.2 MILLIMETERS AT 1 METER DISTANCE. MEASURE THE BEAM SIZE AT 1 METER AND 25cm AT 1.0 WATT AND GREATER THAN OR EQUAL TO 10% IN AIMING BEAM RECORD SET AMP 0 FIBER EFFICIENCY IN GREEN AND AIMING BEAM ON DATA SHEET AND STAMP IN MOTP SECTION 2.
7.32 ADJUST AIMING BEAM THROUGH 50 MICRON FIBER BY THE SECOND AIMING BEAM MIRROR FOR OPTIMUM EFFICIENCY.
7.33 REMOVE 50 MICRON FIBER.
7.34 INSTALL THE ENDOPROBE AND COMPARE INPUT TO OUTPUT POWER WITHOUT CHANGING THE ADJUSTMENT EFFICIENCY SHOULD BE GREATER THAN OR EQUAL TO 90% FOR GREEN AT 1.0 WATT AND GREATER THAN OR EQUAL TO 80% FOR AIMING BEAM. SET POWER TO 0.100W AT 1.0 METER DISTANCE. RECORD EFFICIENCY & SPOT SIZE MEASUREMENT ON DATA SHEET AND STAMP IN MOTP SECTION 2
7.35 INSTALL THE I/O AND COMPARE INPUT TO OUTPUT POWER WITHOUT CHANGING THE ADJUSTMENT EFFICIENCY SHOULD BE GREATER THAN OR EQUAL TO 90% FOR GREEN AT 1.0 WATT AND GREATER THAN OR EQUAL TO 80% FOR AIMING BEAM. SET POWER TO 0.100W AT 1.0 METER DISTANCE. RECORD EFFICIENCY & SPOT SIZE MEASUREMENT ON DATA SHEET AND STAMP IN MOTP SECTION 2
7.36 TURN OFF SYSTEM.
CAUTION
WARNING
CAUTION
SURGICAL BEAM APERTURE TOOL P/N: 995-5420-003 NOTE: THIS TOOL IS USED FOR ADJUSTMENT ONLY
GAUGE, 995-5420-005
542-0000-XXX
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SHEET 15 OF 19

STEP EIGHT

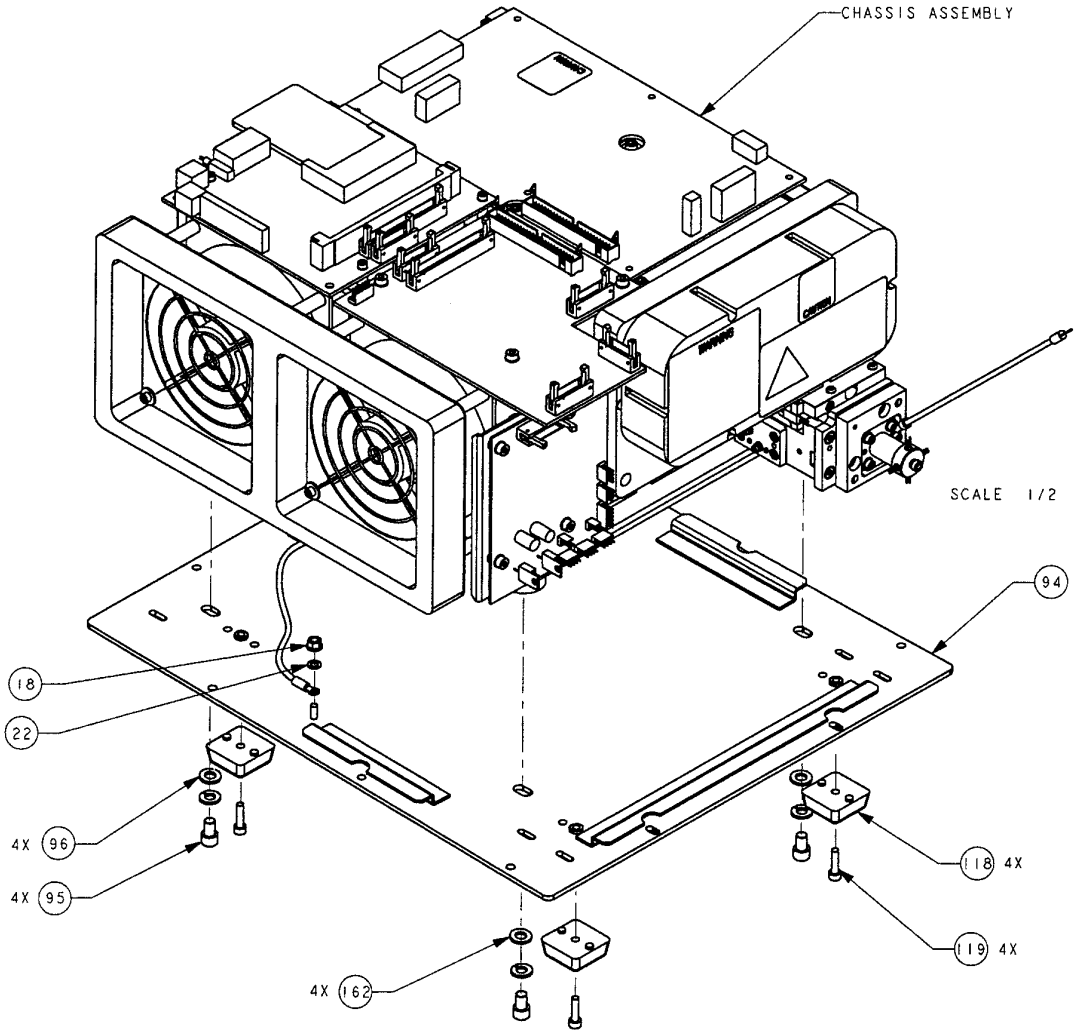
BASE PLATE ATTACHMENT

8.1 ATTACH 4 FEET (ITEM 118) TO THE BOTTOM OF BASE PLATE (ITEM 94) USING 4 SCREWS (ITEM 119).

8.2 PLACE CHASSIS ASSEMBLY ON BASE PLATE (ITEM 94).

8.3 ATTACH GROUND CABLE (ITEM 36) FROM ENGINE ASSEMBLY TO STUD ON BASE PLATE AND SECURE USING ONE (1) EACH NUT (ITEM 18) AND STAR WASHER (ITEM 22).

8.4 SECURE BASEPLATE TO LASER USING (4) EACH SCREWS (ITEM 95) FLAT WASHER (ITEM 162) AND LOCK WASHERS (ITEM 96).



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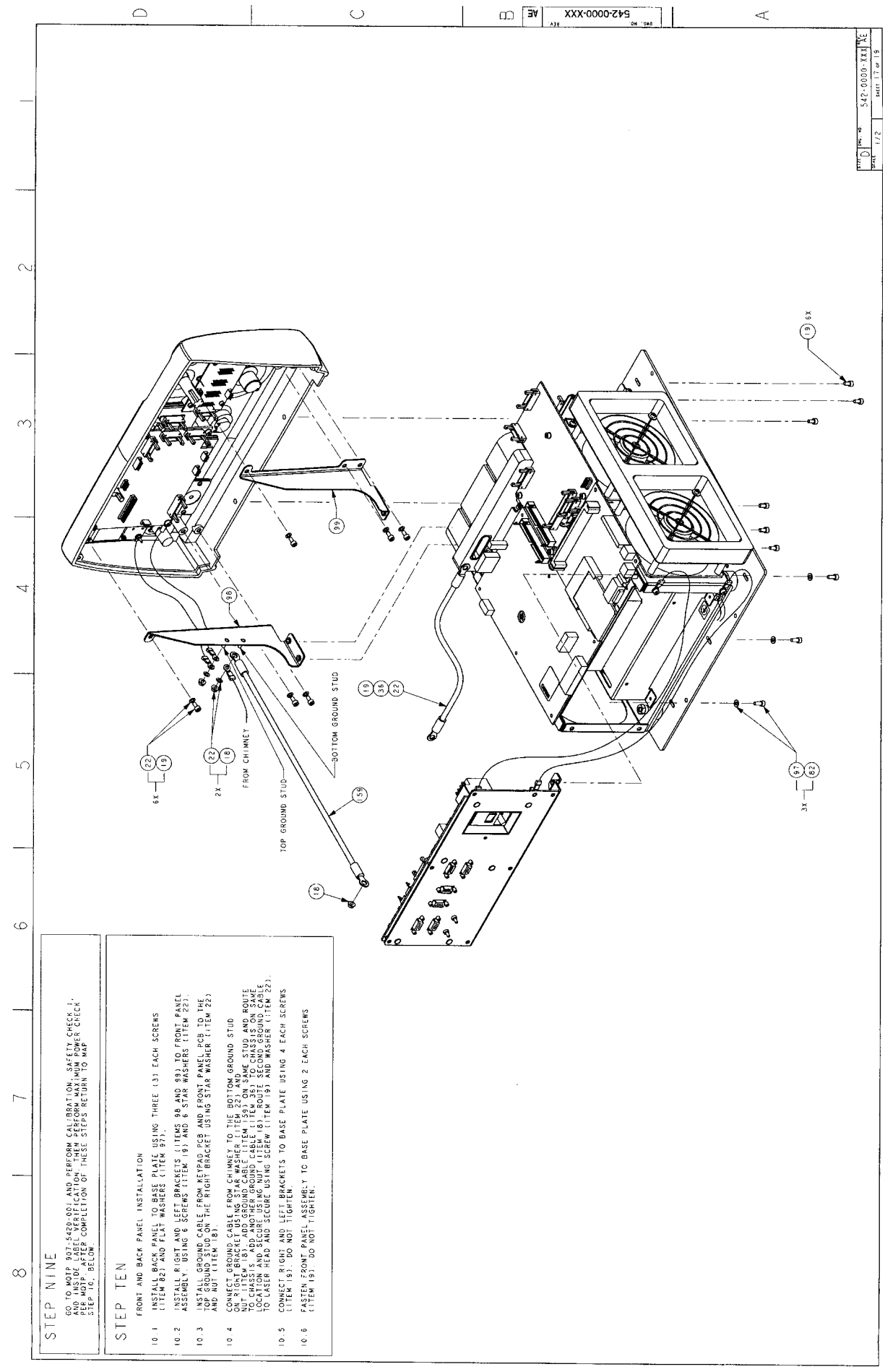
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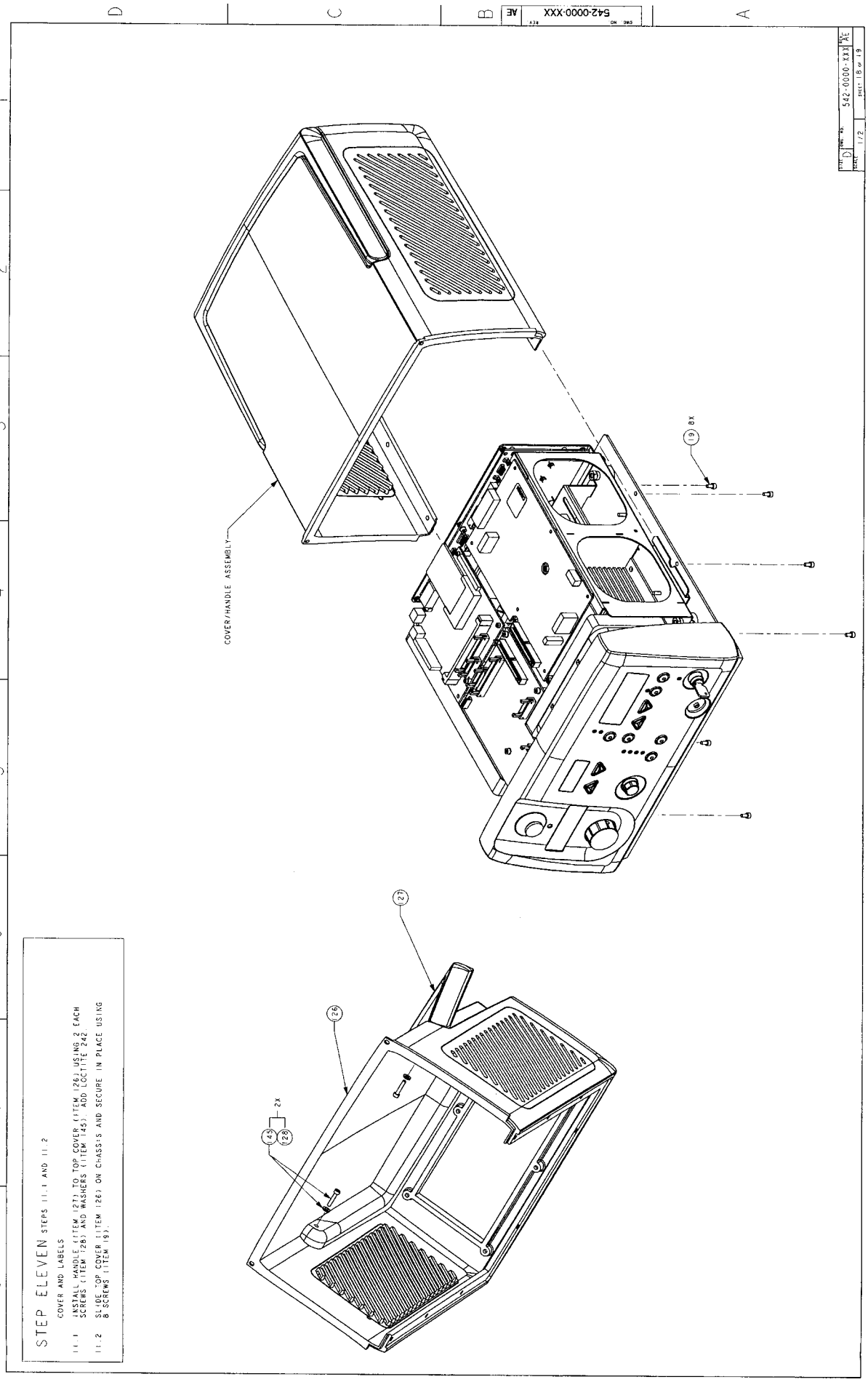
SHEET 17 OF 19
STEP NINE
GO TO MOTP 907-5420-00) AND PERFORM CALIBRATION, SAFETY CHECK (AND INSIDE LABEL VERIFICATION IF NEW MAIN POWER CHECK PER MOTP. AFTER COMPLETION OF THESE STEPS RETURN TO MAP STEP 10, BELOW.
STEP TEN
FRONT AND BACK PANEL INSTALLATION
10.1 INSTALL BACK PANEL TO BASE PLATE USING THREE (3) EACH SCREWS (ITEM 82) AND FLAT WASHERS (ITEM 87).
10.2 INSTALL RIGHT AND LEFT BRACKETS (ITEMS 98 AND 99) TO FRONT PANEL ASSEMBLY. USING 6 SCREWS (ITEM 19) AND 6 STAR WASHERS (ITEM 22).
10.3 INSTALL GROUND CABLE FROM KEYPAD PCB AND FRONT PANEL PCB TO THE TOP GROUND STUD ON THE RIGHT BRACKET USING STAR WASHER (ITEM 22) AND NUT (ITEM 18).
10.4 CONNECT GROUND CABLE FROM CHIMNEY TO THE BOTTOM GROUND STUD ON RIGHT BRACKET USING STAR WASHER (ITEM 22) AND NUT (ITEM 18). ADD GROUND CABLE (ITEM 159) ON SAME STUD AND ROUTE TO CHASSIS AND ANOTHER GROUND CABLE (ITEM 36) TO CHASSIS ON SAME LOCATION AND SECURE USING SCREW (ITEM 19) AND WASHER (ITEM 22). TO LASER HEAD AND SECURE USING SCREW (ITEM 19) AND WASHER (ITEM 22).
10.5 CONNECT RIGHT AND LEFT BRACKETS TO BASE PLATE USING 4 EACH SCREWS (ITEM 19). DO NOT TIGHTEN.
10.6 FASTEN FRONT PANEL ASSEMBLY TO BASE PLATE USING 2 EACH SCREWS (ITEM 19). DO NOT TIGHTEN.
6X
2X
FROM CHIMNEY
BOTTOM GROUND STUD
TOP GROUND STUD
3X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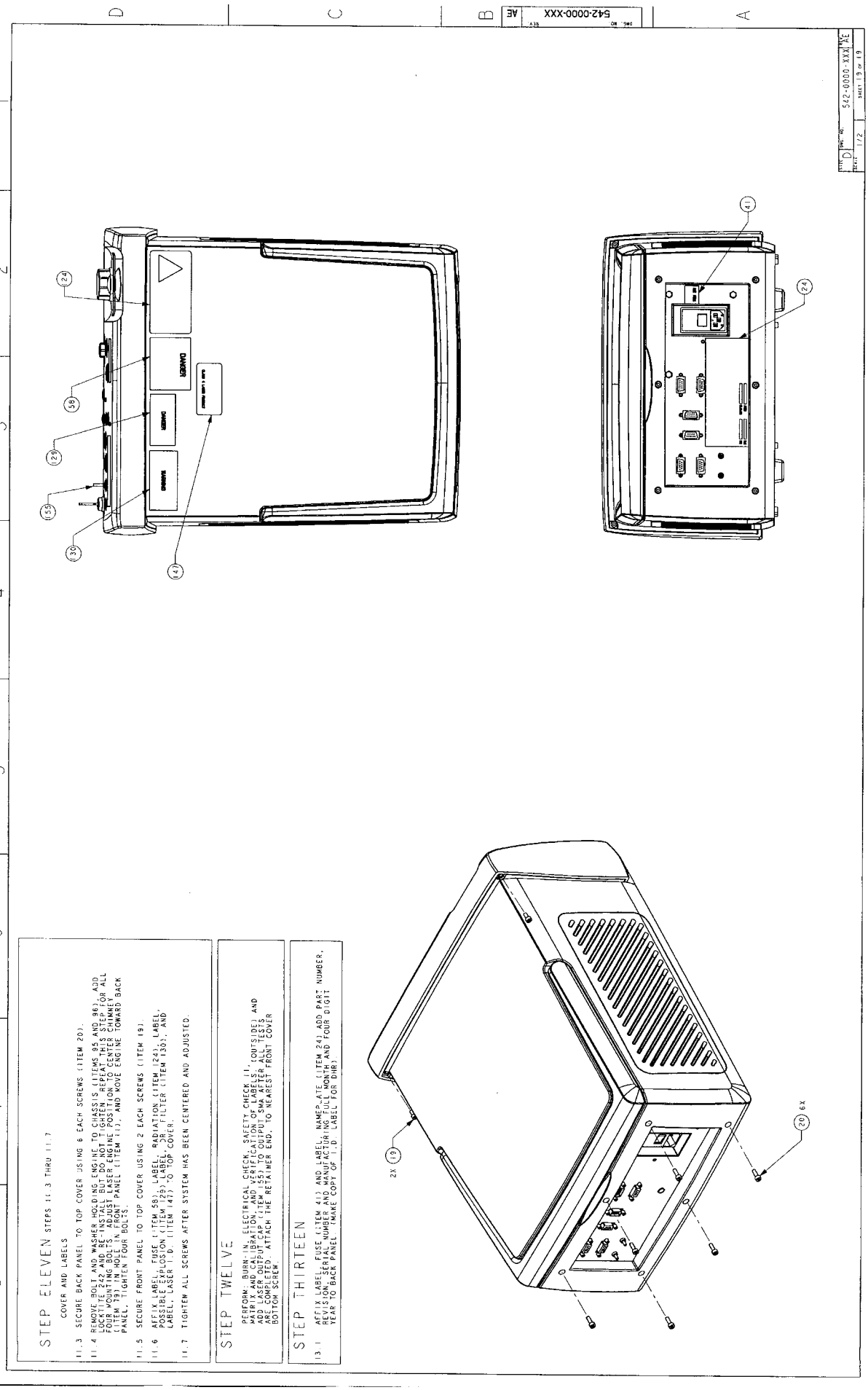
SHEET 18 of 19
SCALE 1/2
COVER/HANDLE ASSEMBLY
(19) 8X
(27)
(26)
(45)
(28)
2X
STEP ELEVEN STEPS 11.1 AND 11.2
COVER AND LABELS
11.1 INSTALL HANDLE ((ITEM 127) TO TOP COVER ((ITEM 126) USING 2 EACH SCREWS ((ITEM 28) AND WASHERS ((ITEM 145). ADD LOCTITE 242.
11.2 SLIDE TOP COVER ((ITEM 126) ON CHASSIS AND SECURE IN PLACE USING 8 SCREWS ((ITEM 19).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STEP ELEVEN STEPS 11.3 THRU 11.7
COVER AND LABELS
11.3 SECURE BACK PANEL TO TOP COVER USING 6 EACH SCREWS (ITEM 20).
11.4 REMOVE BOLT AND WASHER HOLDING ENGINE TO CHASSIS (ITEMS 95 AND 96). ADD LOCKTITE 242 AND REINSTALL BOLT AND WASHER. REPEAT FOR ALL FOUR MOUNTING BOLTS. ADJUST LASER ENGINE POSITION TO CENTER CHIMNEY (ITEM 79) IN HOLE IN FRONT PANEL (ITEM 11), AND MOVE ENGINE TOWARD BACK PANEL. TIGHTEN FOUR BOLTS.
11.5 SECURE FRONT PANEL TO TOP COVER USING 2 EACH SCREWS (ITEM 19).
11.6 AFFIX LABEL, FUSE (ITEM 58), LABEL, RADIATION (ITEM 124), LABEL, POSSIBLE EXPLOSION (ITEM 129), LABEL, SAFETY FILTER (ITEM 130), AND LABEL, LASER I.D. (ITEM 147) TO TOP COVER.
11.7 TIGHTEN ALL SCREWS AFTER SYSTEM HAS BEEN CENTERED AND ADJUSTED.
STEP TWELVE
PERFORM BURN-IN, ELECTRICAL CHECK, SAFETY CHECK (1), MATRIX AND CALIBRATION, AND VERIFICATION OF LABELS (OUTSIDE) AND ADD LASER OUTPUT CAP (ITEM 155) TO OUTPUT SMA AFTER ALL TESTS ARE COMPLETED. ATTACH THE RETAINER END, TO NEAREST FRONT COVER BOTTOM SCREW.
STEP THIRTEEN
13.1 AFFIX LABEL, FUSE (ITEM 41) AND LABEL, NAMEPLATE (ITEM 24) ADD PART NUMBER, REVISION, SERIAL NUMBER AND MANUFACTURING MONTH AND FOUR DIGIT YEAR TO BACK PANEL (MAKE COPY OF I.D. LABEL FOR DHR)
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542-0000-XXX
SHEET 19 OF 19
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SECTION SEVEN
ADDITIONAL INFORMATION

This section of the manual contains service information for the various accessories that are available for use with the EyeLite®

SLIT LAMP ADAPTATIONS

A slit lamp assembly is typically used to deliver the EyeLite® laser treatment beam to the patient. An adaptation, mounted on the slit lamp, is required to interface the slit lamp to the EyeLite®.

The adaptation consists of a slit generator, zoom assembly with micromanipulator, and a doctor's filter. The slit generator projects a light beam that illuminates the eye for clear viewing, and helps the doctor accurately locate the focal plane. The parfocal zoom assembly is used to set the spot size of the aiming and treatment beams, and a micromanipulator is provided for fine adjustment of the beams' position. The doctor's filter provides eye protection for the physician.

ALCON SL1000 AND ZEISS** 30SL SLIT LAMP ADAPTATIONS

This section of the manual covers installation of the adaptation on the Alcon SL1000 and the Zeiss** 30SL slit lamps, and a general procedure for aligning the slits and zoom assemblies.

The Alcon SL1000 and Zeiss** 30SL slit lamps are shown in Figures 7-1 and 7-2 respectively. Adaptation components are shown in dark gray.

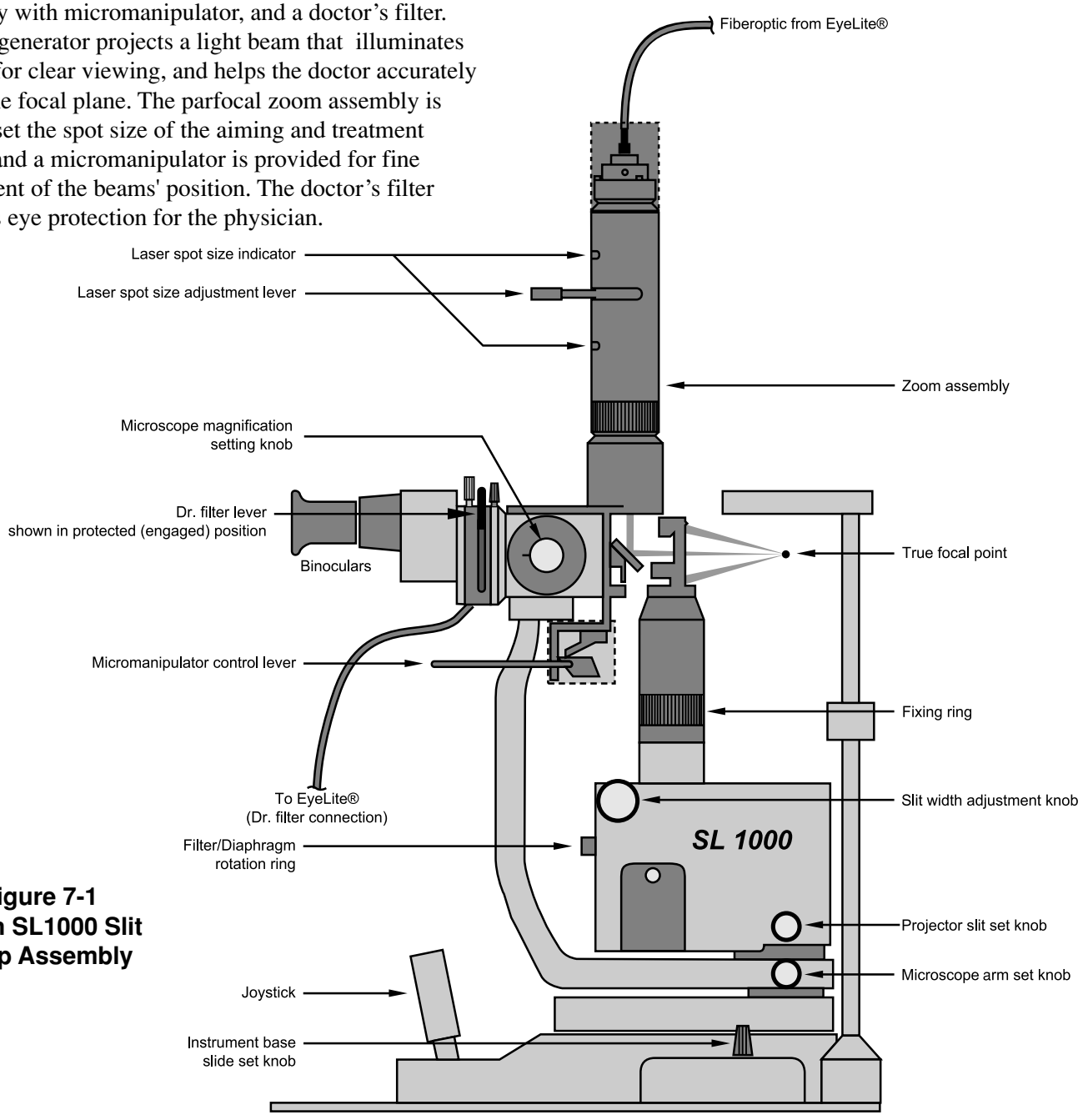


Figure 7-1
Alcon SL1000 Slit Lamp Assembly

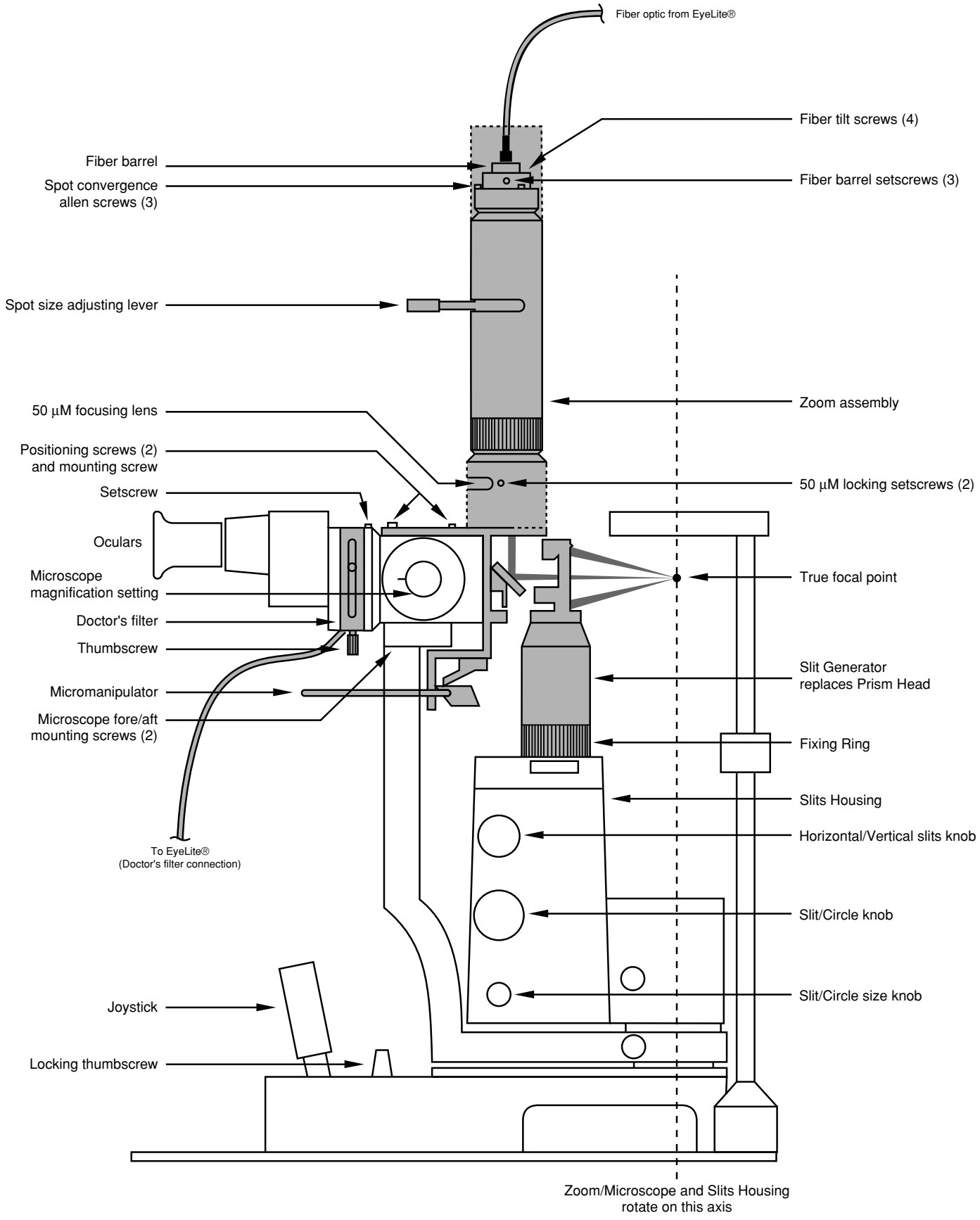


Figure 7-2
Zeiss 30SL Slit Lamp Assembly**

MOUNT ADAPTATION ONTO ALCON SL1000 OR ZEISS** 30SL SLIT LAMP

1 Install Slit Generator

1.1 Loosen fixing ring on top of slits housing and lift prism head up and away.

1.2 Set slit generator assembly down into fixing ring and adjust to fit onto index pin. Tighten fixing ring to secure the slit generator in place.

2 Install Zoom/Micromanipulator

The Zoom/Micromanipulator assembly is installed onto the microscope. The zoom may be temporarily removed at a later point to allow adjustment of the microscope focus.

2.1 Remove the two positioning screws from zoom assembly.

2.2 Slide zoom/micromanipulator assembly into place on front of microscope.

2.3 Insert positioning screws to correctly align zoom onto scope (Do not overtighten).

2.4 Insert and tighten the single mounting screw.

2.5 Remove zoom cover. Insert fiber optic through zoom cover and connect to top of zoom.

3 Install Doctor's Filter

The Doctor's Filter assembly is installed between the viewing oculars and the central microscope body.

WARNING!

Incorrect installation of Doctor Filter can result in eye hazards to the physician.

3.1 Remove setscrew from doctor's filter, and thumbscrew from microscope. Setscrew will be used to secure doctor's filter to microscope, and thumbscrew to secure oculars to filter.

3.2 Remove oculars from microscope.

3.3 Insert doctor's filter into microscope and secure with setscrew.

3.4 Insert oculars into doctor's filter and secure with thumbscrew.

3.5 Connect cable from doctor's filter to EyeLite® rear panel.

ZEISS** ADAPTATION ALIGNMENTS

All instruments are adjusted at time of manufacture, and should not normally require any adjustment after installation. The following procedure may be used to test the system for proper alignment, and make the proper focal adjustments if needed.

1 Slits Alignment

1.1 ***For ALCON SL1000*:** Install calibration rod. Go to step 1.5.

***For ZEISS** 30SL*:** Place a target (small square of plastic with millimeter grid graph paper) at the patient's chin rest in a vertical position. (Tilting the target slightly toward or away from the microscope will accentuate the slits movement and facilitate the alignment process).

1.2 Turn slit lamp ON. Set magnification to its lowest setting. Set slit/circle knob to the slits position. Set horizontal/vertical slits knob to the vertical position.

1.4 Refer to Figure 7-3. While viewing through oculars, use the joystick to move the lamp slowly from back to front, while also swinging the slits housing left and right. Locate the point at which the vertical slits pivot about through the center, as shown in Figure 7-3c. Tighten the brake thumbscrew to hold the lamp in place.

1.5 Set horizontal/vertical slits knob to the horizontal position. The horizontal slits should overlap, and should be centered in the field of view. If not, adjust the setscrews on both the upper and lower mirror mount to bring the slits together, in both horizontal and vertical orientations, and centered in the field of view. Figures 7-4 and 7-5 show the location of the adjustment setscrews.

1.6 ***For Alcon SL1000 only***: Check that slit edges are in sharp focus. If not, loosen slit focus adjustment screw and position as necessary to attain sharp focus.

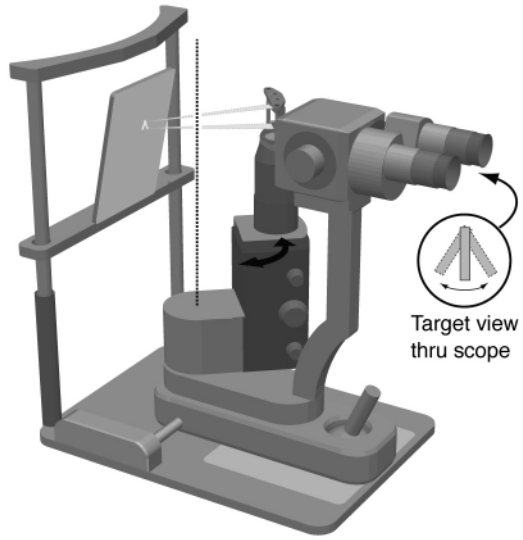


Figure 7-3a
Focal Point In Front Of Target/Calibration Rod

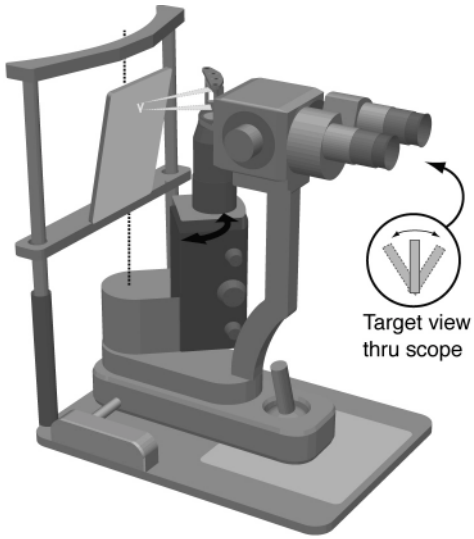


Figure 7-3b
Focal Point Behind Target

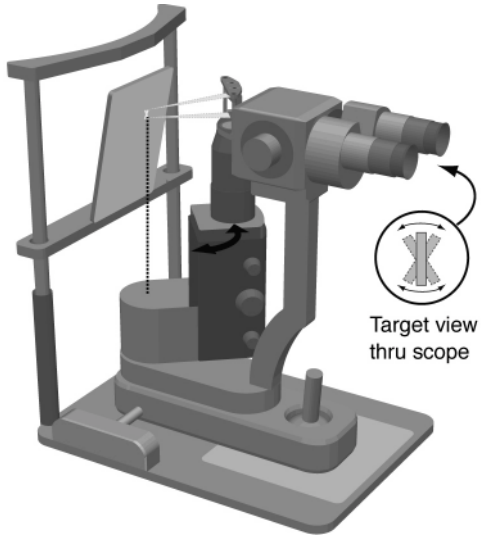


Figure 7-3c
Focal Point Properly Positioned On Target

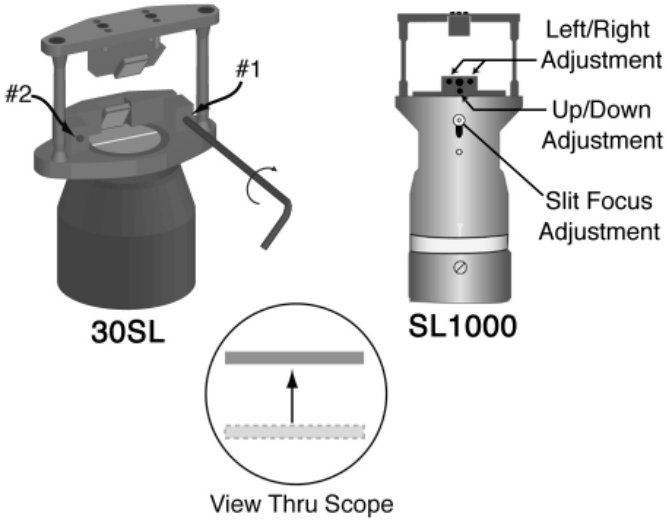


Figure 7-4
Lower Slits Mirror Adjustment

2 Microscope Focus

2.1 Set your accommodation on both the right and left oculars, and verify both oculars are pressed all the way into the holder assembly.

2.2 Set microscope to the highest magnification. Set the slits to the horizontal orientation, then open them to a full circle.

2.3 While viewing through oculars, use the joystick to move the slit lamp back and forth, to reach the point of sharpest focus on the target. Lock the lamp in place with the brake knob.

2.4 Narrow the slits down to fine horizontal lines. If the microscope is properly focused, the lines should be exactly together (assuming the slits were properly aligned in the previous steps). If so, proceed to step 3. If not, the microscope will require a focusing adjustment.

2.5 Temporarily remove the zoom/micromanipulator assembly from microscope, to gain access to the front microscope mounting screw.

2.6 Refer to Figure 7-6. Rotate the slits to the vertical orientation. With slit lamp locked at focal point, loosen the two mounting screws at bottom of microscope head. Move the scope body fore and aft to obtain the sharpest possible focus. At the same time, pivot the scope as needed to center the slits in the field of view. Tighten the mounting bolts, and retest per step 2.4. Replace the zoom assembly onto the microscope when complete.

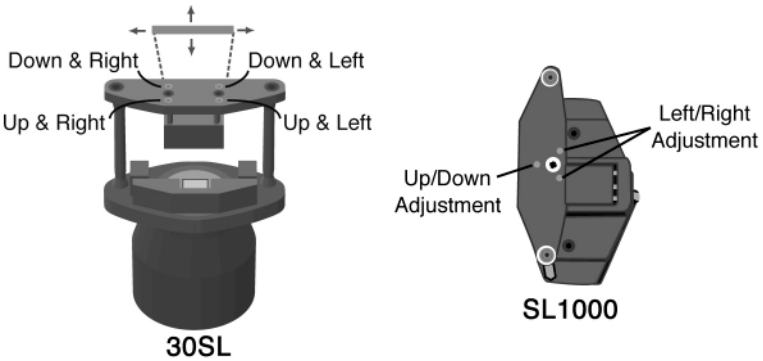


Figure 7-5
Upper Slits Mirror Adjustment

3 Zoom Adjustments

The zoom adjustment consists of fiber orientation, 1000 micron spot, 50 micron spot, and spot convergence. Fiber orientation and spot convergence adjustments are interactive.

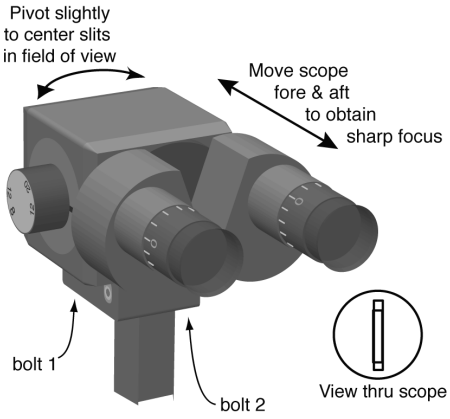


Figure 7-6
Microscope Focus Adjustment

3.1 1000 Micron Spot Adjustment

3.1.1 Turn the laser ON, and allow to complete startup self test. Select the Continuous exposure duration, and set power to 0.10 watts on the front panel. Set the brightness of the aiming beam as desired for comfortable viewing through the microscope.

3.1.2 Set slits to the horizontal orientation. While viewing through oculars, use joystick to move slit lamp back and forth to point where slits come together. Lock slit lamp in place with brake knob.

3.1.3 Refer to Figure 7-7. Set spot size adjusting lever to 1000 micron. Loosen the two fiber barrel setscrews. While viewing through oculars, slide fiber barrel connector up and down to obtain sharpest possible spot. Tighten setscrews when complete.

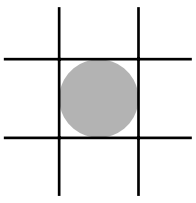


Figure 7-7
1000 Micron Spot Focused On Graph Paper

3.2 Adjust 50 Micron Spot

3.2.1 Set the slits to the horizontal orientation, then narrow them down until they completely disappear. Set the spot size to 50 micron. While viewing the aiming spot through oculars, use the joystick to move slit lamp back and forth, to reach the point where the spot is the smallest. Lock the lamp in place with the brake knob.

3.2.2 Open the slits slightly. If the 50 micron spot is properly focused, the lines should be exactly together, indicating lamp is positioned at focal plane (assuming the slits were properly aligned in the previous steps 1.0 - 1.5.) If so, proceed to step 3.3. If not, the 50 micron spot will require a focusing adjustment.

3.2.3 Set spot size adjusting lever to 50. Loosen the two 50 micron locking setscrews, and make a small adjustment of the 50 micron focusing lens inside zoom tower. Retest beginning at step 3.2.1. Continue adjustments until the smallest 50 micron spot coincides exactly with the slits focal point. Tighten setscrews when complete.

3.3 Fiber Orientation

Each laser fiber is slightly different, so it is necessary to adjust fiber orientation as it enters the zoom to ensure the beam travels through the optical center of the zoom elements.

3.3.1 Refer to Figure 7-8. Using the joystick, move slit assembly to side and fire laser on a nearby wall. Adjust the four fiber tilt screws at top of zoom, to adjust tilt of fiber until spot on wall is perfectly round without clipping. This adjustment can be facilitated by observing centering of the spot on the micromanipulator mirror.

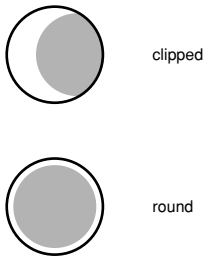


Figure 7-8
Spot is Perfectly Round on Wall

3.4 Adjust Spot Convergence

3.4.1 Use the joystick to position aiming spot on target graph paper, so spot is centered over an intersecting pair of grid lines, as shown in Figure 7-9.

3.4.2 While viewing through oculars, run spot size selector through complete range, from 50 to 1000 micron and back. The spot should remain centered on grid lines throughout range of spot sizes. If so, spot convergence is correct. Proceed to step 4.

3.4.3 Set spot size to 50 micron, and use joystick as needed to center spot exactly over intersecting grid lines on the target graph paper. Note exact position of spot, then change spot size to 1000 micron. Slightly loosen the three spot convergence allen screws on top of zoom flange and shift flange to bring 1000 micron spot back to previous position of the 50 micron spot. Tighten three spot convergence allen screws, and retest beginning at step 3.4.1.

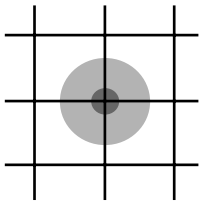


Figure 7-9
Spot is Centered at all Sizes

NOTE: Fiber orientation and spot convergence adjustments are interactive. Repeat steps 3.3 and 3.4 until no further adjustment is required.

3.4.4 Install cap with set screws on top of zoom.

4 Adjust Micromanipulator

4.1 Set the slits to the vertical orientation. Set spot size to 50 microns.

4.2 Viewing through oculars, observe positions of aiming spot and slits (see Figure 7-10). If not in alignment, the aiming spot must be moved horizontally to overlap the slits.

To move aiming spot horizontally over slits, adjust and tighten set screws on the right and left sides of micromanipulator until spot and slits are aligned (see Figure 7-11).

4.3 Set the slits to the horizontal orientation. Viewing through oculars, observe positions of aiming spot and slits. If not in alignment, aiming spot must be moved vertically over slits.

To move aiming spot vertically over slits, loosen locking setscrew on side of micromanipulator and adjust screw on bottom of micromanipulator until spot and slits are aligned. Tighten the locking setscrew when complete.

5 Perform the "Setting Terminal Efficiencies" procedure in Section Four of this manual.

6 Perform the EyeLite® Service Test Procedure.

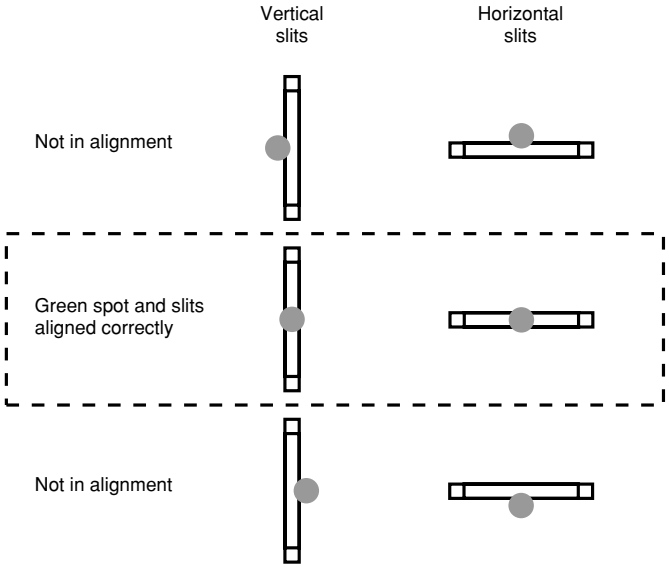


Figure 7-10
50 Micron Aiming Spot Overlaps Slits

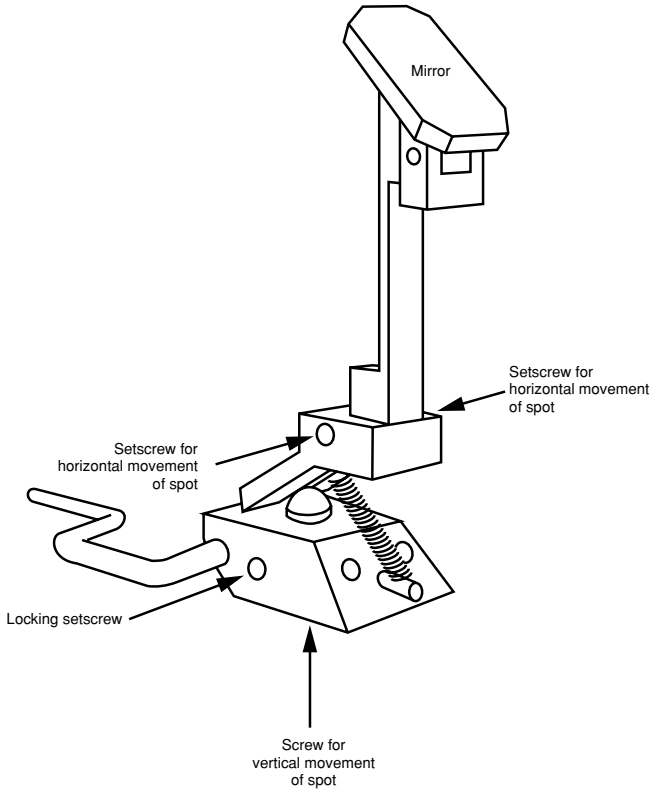


Figure 7-11
Micromanipulator Adjustments

HAAG-STREIT SLIT LAMP ADAPTATION

This section of the manual covers installation of the adaptation on the Haag-Streit slit lamp, and a general procedure for aligning the slits and zoom assemblies.

The Haag Streit slit lamp is shown in Figure 7-12 with its adaptation components depicted in gray.

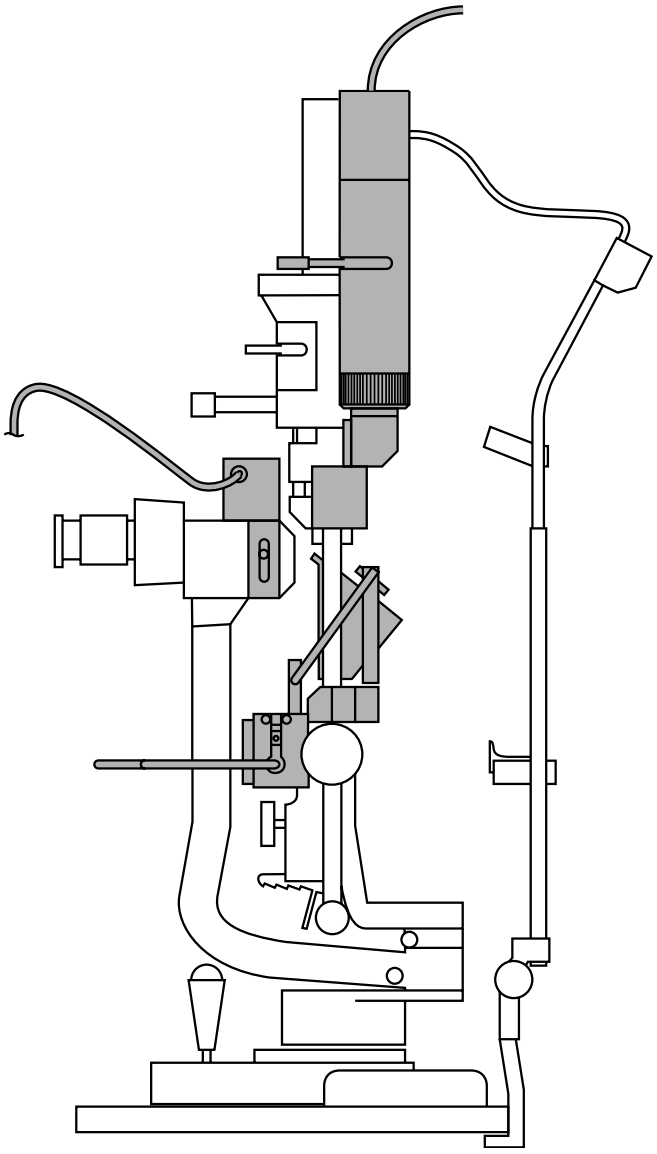


Figure 7-12
Haag-Streit Slit Lamp Assembly

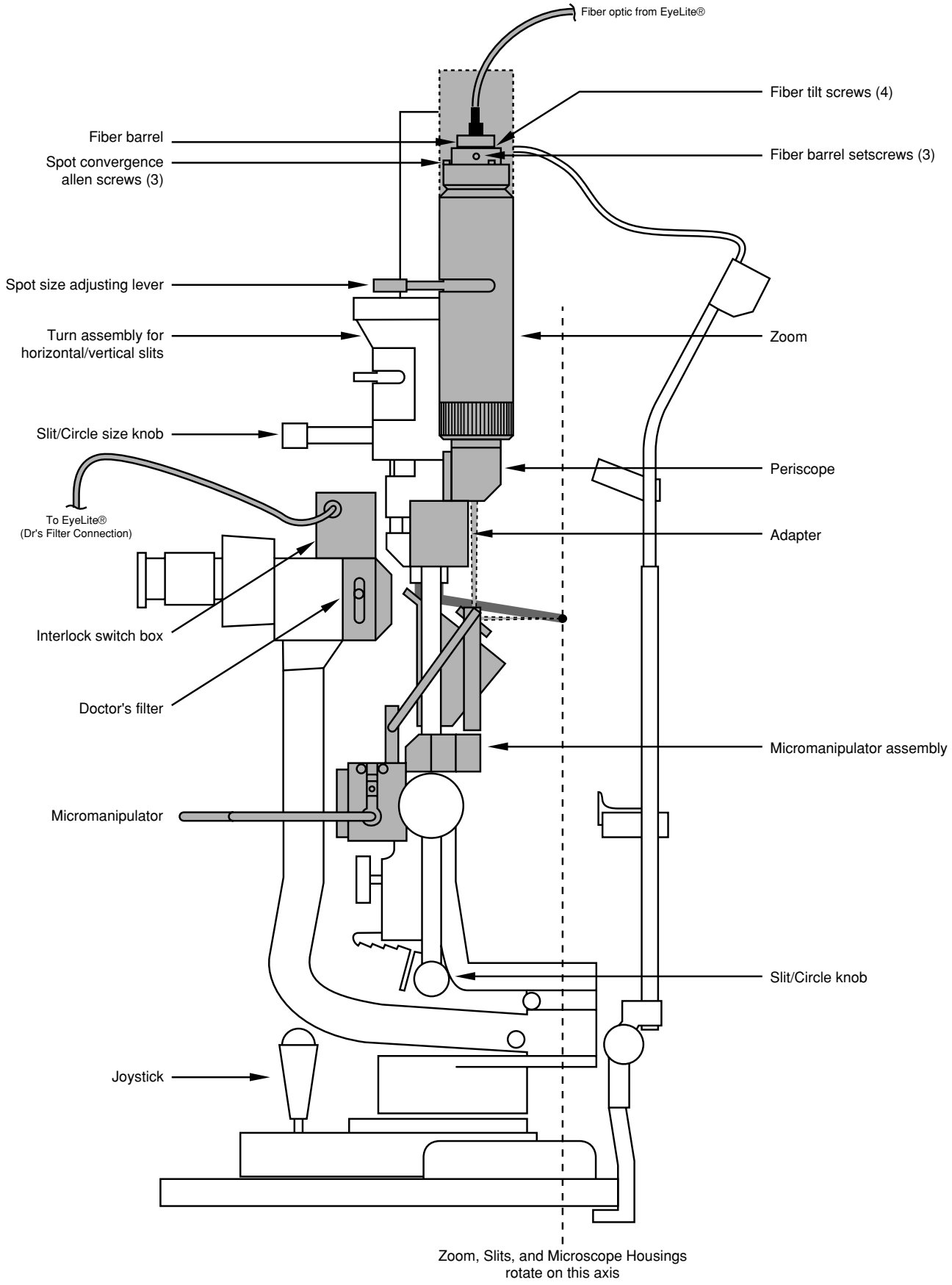


Figure 7-13
Haag-Streit Slit Lamp Components

MOUNT ADAPTATION ONTO SLIT LAMP

1 Install Zoom and Micromanipulator

1.1 Verify the slit lamp power is OFF, and remove the mains plug from the AC outlet.

1.2 Refer to Figure 7-13. Unplug the two-prong connector for the main illumination bulb at the top of the slits source assembly. Loosen the retaining screw under the connector, and lift the bulb housing assembly up and off of the slit lamp. Set the lamp housing assembly aside.

1.3 Remove the two M2.5 allen bolts that secure the entire slits housing to the slit lamp support struts. Carefully lift the slits housing assembly up and off the slit lamp and set aside.

1.4 Mount the micromanipulator assembly onto the two slit lamp support struts, and secure with two M2.5 allen bolts.

1.5 Mount the periscope adapter onto the two support struts. Hold the periscope in place, and replace the slits housing assembly onto the two support struts. Secure the periscope and slits housing assembly on the struts with two M2.5 allen bolts. Use caution to avoid overtightening the left side bolt into the strut or it may deform the slit control pin which runs through the center of the left support strut.

1.2 Screw zoom onto periscope.

1.3 Remove zoom cover. Insert fiber optic through zoom cover and connect to top of zoom.

2 Install Doctor's Filter

WARNING!

Incorrect installation of Doctor's Filter may result in eye hazards to the physician.

2.1 Unscrew cover from front of microscope.

2.2 Screw doctor's filter onto front of microscope, and secure with the two setscrews.

2.3 Connect cable from Doctor's Filter to EyeLite® rear panel.

HAAG STREIT ADAPTATION ALIGNMENTS

All instruments are adjusted at time of manufacture, and should not normally require any adjustment after installation. The following procedure may be used to test the system for proper alignment, and make the proper focal adjustments if needed.

1 Zoom Alignments

The zoom adjustment consists of fiber orientation, 1000 micron spot, 50 micron spot, and spot convergence. Fiber orientation and spot convergence adjustments are interactive.

1.1 Turn the laser ON, and allow it complete the startup self test. Select the Continuous exposure duration, and set power to 0.10 watts on the control box. Set the brightness of the HeNe aiming beam as desired for comfortable viewing through the microscope.

1.2 Haag Streit slit lamps are usually equipped with an Aiming Stick tool. If available, insert the stick into the hole at the top of the pivot of the microscope and slit source arms. If no aiming stick is available, place a target (small square of plastic with millimeter grid graph paper) at the patient's chin rest in a vertical position. While viewing through the oculars, bring the microscope to a fine focus on the target, and lock the lamp in position with the brake knob.

2 1000 Micron Spot Adjustment

2.1 Refer to Figure 7-14. Set spot size adjusting lever to 1000 micron. Loosen the two fiber barrel setscrews. While viewing through oculars, slide fiber barrel connector up and down to obtain the sharpest possible 1000 micron spot. Tighten setscrews when complete.

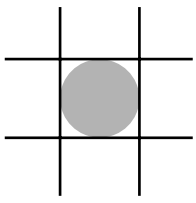


Figure 7-14
1000 Micron Spot Focused on Graph Paper

3 Adjust 50 Micron Spot

3.1 Set spot size adjusting lever to 50. Loosen the two 50 micron locking setscrews, and adjust the 50 micron focusing lens inside zoom tower to produce the smallest possible spot. Tighten the setscrews when complete.

4 Fiber Orientation

Each laser fiber is slightly different, so it is necessary to adjust fiber orientation as it enters the zoom to ensure the beam travels through the optical center of the zoom elements.

4.1 Using the joystick, move slit assembly to side and fire laser on a nearby wall. Adjust the four fiber tilt screws at top of zoom to adjust tilt of fiber until hot spot of the laser beam is in the center of the beam projected on the wall.

5 Adjust Spot Convergence

5.1 Use the joystick to position the aiming beam spot on the target graph paper such that the spot is centered over intersecting grid lines, as shown in Figure 7-15 (If an aiming stick tool is being used as a target, select a suitable fixed reference point, or tape a small piece of graph paper on the face of the stick to serve as a reference.

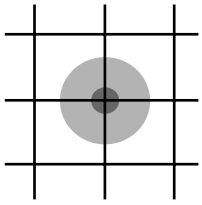


Figure 7-15
Spots Overlap Crosshairs

5.2 While viewing through the oculars, run the spot size selector through its complete range, from 50 to 1000 micron and back. The spot should remain centered on the grid lines throughout the whole range of spot sizes. If so, the spot convergence is correct. Proceed to step 6.

5.3 Set the spot size to 50 micron, and use the joystick if needed to center the spot exactly over intersecting grid lines on the target graph paper. Note the exact position of the spot, then change the spot size to 1000 micron. Slightly loosen the three spot convergence allen screws on top of zoom flange and shift flange to bring the 1000 micron spot back to the same previous position of the 50 micron spot. Tighten three spot convergence allen screws, and retest beginning at step 5.1.

6 Periscope Adjustments.

6.1 Loosen screw under periscope and remove end cap. Using the joystick, move slit assembly to side and fire laser on a nearby wall. Refer to Figure s 7-17 and 7-18.

6.2 Loosen locking screw under periscope and turn slot in mirror support to position the spot so that it is evenly clipped vertically (see figure 7-16). After adjustment, tighten locking screw.

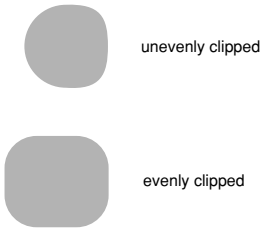


Figure 7-16
Spot is Clipped Evenly on all Four Sides

6.3 Turn adjusting screws in mirror support to position the spot so that it is evenly clipped horizontally (see figure 7-16).

NOTE: The fiber orientation, spot convergence, and periscope adjustments are interactive. Repeat steps 4, 5, and 6 until no further adjustment is required.

6.4 Install cover over top of zoom and secure with set screws.

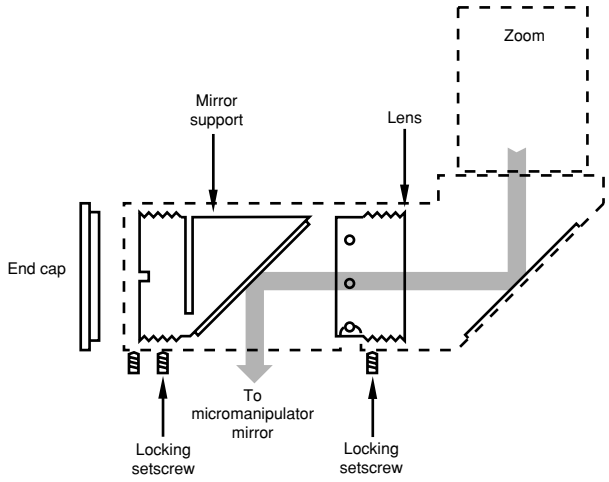


Figure 7-17
Periscope

7 Adjust Micromanipulator

7.1 Refer to Figure 7-19. Remove micromanipulator cover.

7.2 Set spot size adjusting lever to 50 micron and turn slit lamp ON.

7.3 Set slit in vertical position. Loosen locking setscrews on top of micromanipulator and adjust allen screw on side of micromanipulator until spot is centered on vertical slit (see Figure 7-20). Tighten locking setscrews.

7.4 Set slit in horizontal position. Loosen locking setscrew on side of micromanipulator and adjust screw on top until spot is centered on horizontal slit. Tighten locking setscrew.

7.5 Repeat prior two steps until no more adjustments are needed.

7.6 Turn slit lamp and laser OFF, when complete and replace micromanipulator cover.

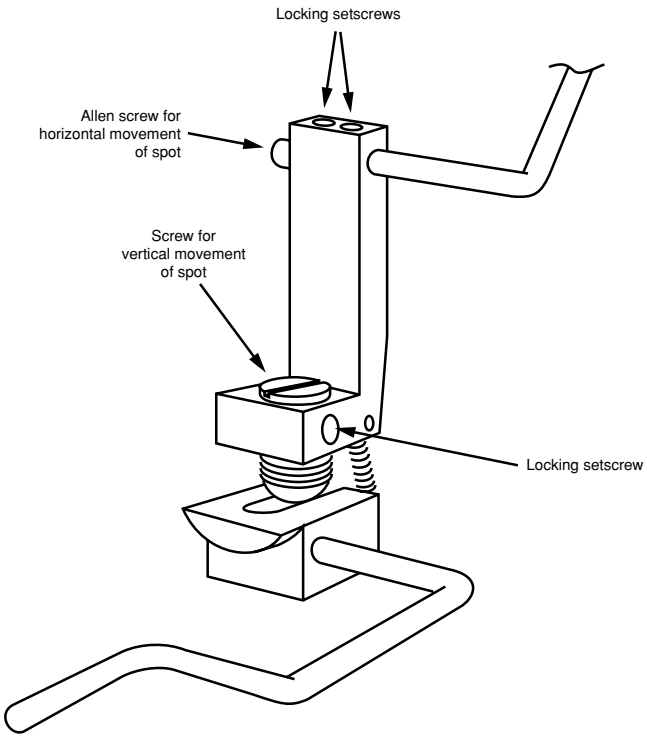


Figure 7-19
Micromanipulator

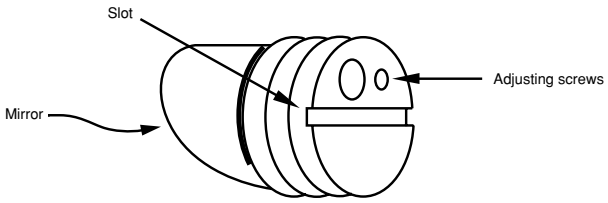


Figure 7-18
Mirror Support

8.0 Perform the "Setting Terminal Efficiencies" procedure in Section Five of this manual.

9.0 Perform the EyeLite® Service Test Procedure.

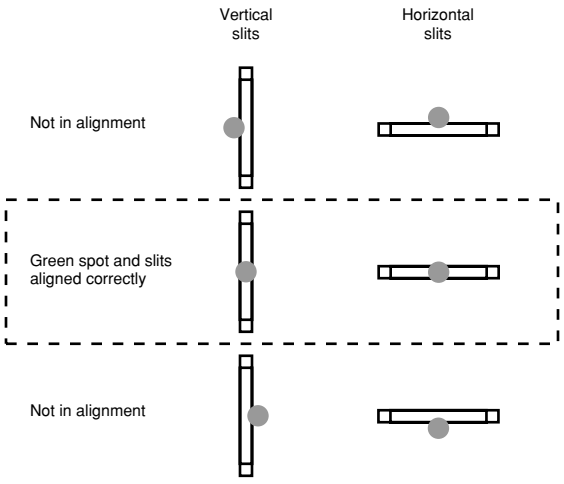


Figure 7-20
50 Micron spot Overlaps Slits

ZEISS** SL130 SLIT LAMP ADAPTATION

This section of the manual covers installation of the adaptation for the Zeiss** SL130 slit lamp, and a general procedure for proper focus of the laser beam.

The Zeiss** SL130 slit lamp is shown in Figure 7-21 with its adaptation components shown in grey.

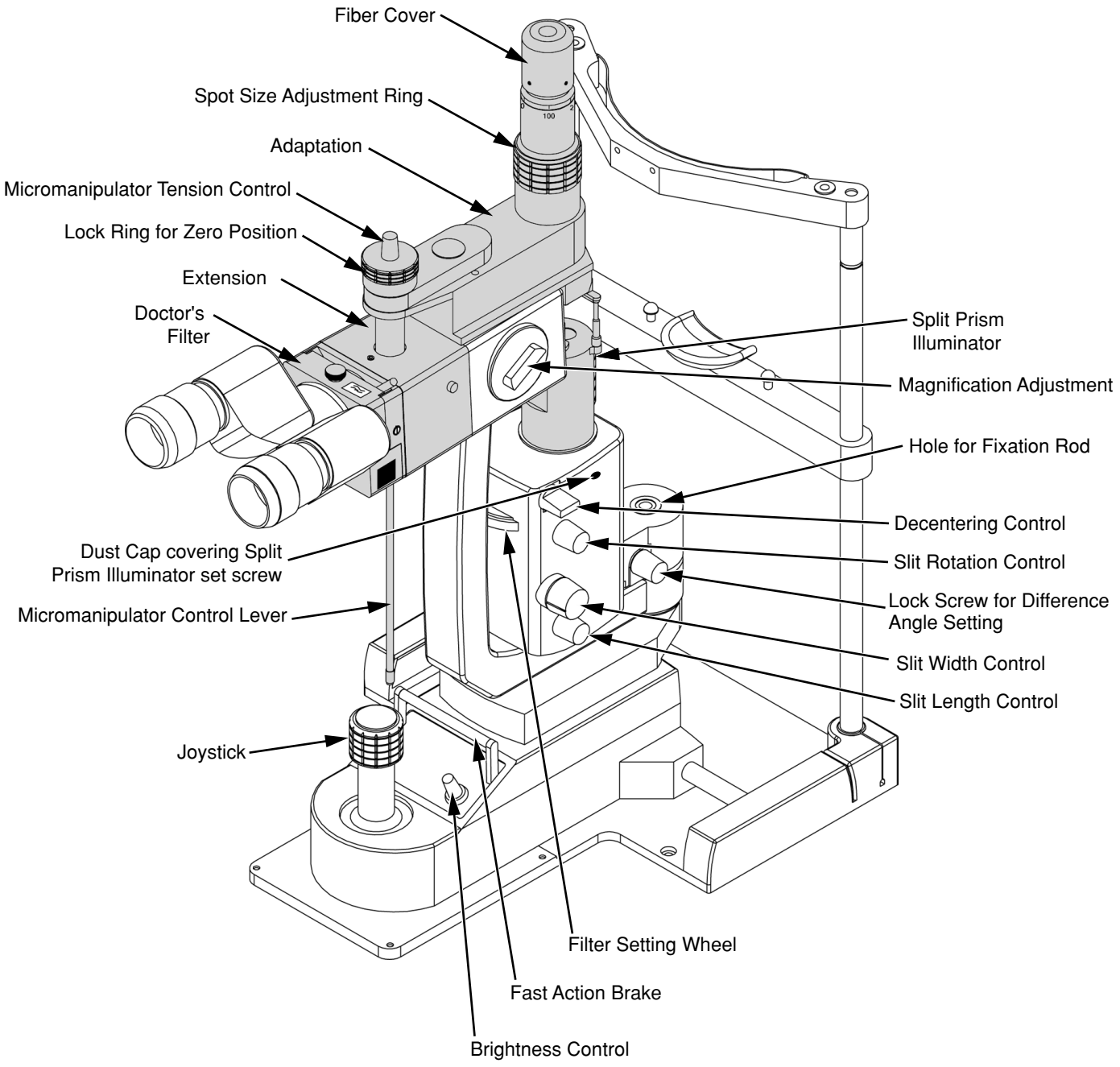


Figure 7-21
Zeiss SL130 Slit Lamp and Adaptation**

MOUNTING THE ADAPTATION COMPONENTS ONTO ZEISS** SL130 SLIT LAMP

1 Install Split Prism Illuminator

1.1 If present, remove slit generator that is currently installed in the slit lamp. Remove black plastic dust cap (see Figure 7-21) on slits housing to access set screw that secures slit generator.

1.2 Slide the split prism illuminator down into slits housing.

1.3 Tighten set screw and replace black plastic dust cap on slits housing.

2 Install Extension, Doctor's Filter, and Binocular Assembly

2.1 Loosen set screw located on top of slit lamp.

2.2 Install extension and secure with set screw.

2.3 Mount doctor's filter onto extension and secure with set screw. Rotate filter arm to insure free movement.

2.4 Mount binocular assembly with ocular onto doctor's filter and secure with thumbscrew.

3 Install Adaptation and Micromanipulator

3.1 Carefully feed micromanipulator arm through hole in extension and position adaptation on top of slit lamp. Secure by tightening recessed screw with a standard screwdriver.

3.2 Mount fiber optic cable wireguide and retainer to chinrest and secure using thumbscrew. Mount to whichever side is closest to EyeLite® (see Figure 7-22).

3.3 Position wireguide as necessary and secure by tightening setscrew on retainer.

3.4 Loosen three set screws that secure fiber cover to the top of the adaptation. Remove cover and SMA dust cover (if necessary).

3.5 Feed fiber optic cable through wireguide and fiber cover, then attach the fiber optic cable to the SMA port (do not reattach fiber cover to adaptation at this time).

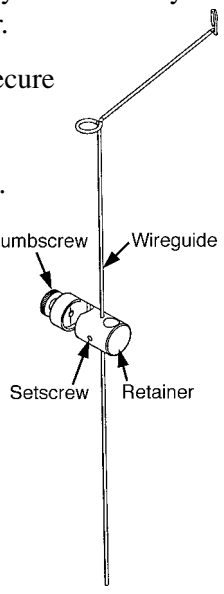


Figure 7-22
Wireguide and Retainer

4 Slit Generator Adjustment

4.1 Adjust the eyepieces to match your eyes.

4.2 Set microscope magnification to 20.

4.3 If available, insert fixation rod into the hole at top of pivot of the microscope and slit source arms (see Figure 7-21). If no fixation rod is available, place a target (small square of plastic with millimeter grid graph paper) at the patient's chin rest in a vertical position.

4.4 Turn on light source for slit lamp and set a narrow slit.

4.5 Check to see if upper slit is in center of field of view. If not, align the upper mirror.

4.5.1 Upper mirror alignment.

4.5.1.1 For lateral adjustment, loosen screws (1, Figure 7-23) and rotate entire carrier plate sideways until slit is centered. Tighten screws.

4.5.1.2 For vertical adjustment, use push and pull screws (2, Figure 7-23) on mirror mount. Be careful not to strain mirror excessively.

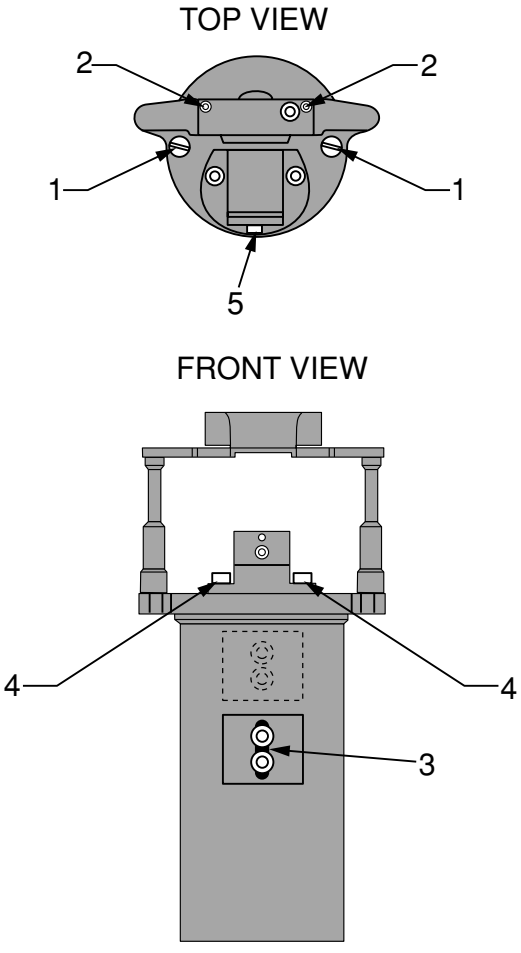


Figure 7-23
Split Prism Illuminator

4.6 Check that slit lamp is focused on the target. If not adjust microscope head.

4.6.1 Adjusting the microscope head.

4.6.1.1 Set magnification to its maximum value.

4.6.1.2 Loosen two screws that secure the microscope head. Screws are located on underside of microscope, adjacent to magnification adjustment.

4.6.1.3 Move microscope head forward or backward until slit image is focused and still centered in field of view. Tighten screws.

4.7 Check that upper slit edges are in sharp focus. If not:

4.7.1 Loosen two arresting screws on front of split prism illuminator (opposite side to 3 in Figure 7-23). Shift sub-assembly to position of maximum edge definition, then tighten both screws.

4.8 Check that the lower slit edges are in sharp focus. If not:

4.8.1 Loosen the two arresting screws on rear of split prism illuminator (3, Figure 7-23). Shift sub-assembly to position of maximum edge definition, then tighten both screws.

4.8.2 Check that lower slit is superimposed with upper slit. If not:

4.8.2.1 For lateral adjustment, loosen two hex screws at prism tray (4, Figure 7-23) then rotate the subassembly axially until slits are superimposed on one another. Tighten screws.

4.8.2.2 For vertical adjustment, turn adjustment screws (5, Figure 7-23) until slits are superimposed on one another.

4.8.2.3 Repeat steps 4.8.2.1 and 4.8.2.2 as necessary.

5 Micromanipulator/Zoom Adjustment

5.1 Set zoom spot size to 100µm.

5.2 Set microscope magnification to 20 and lock micromanipulator lever.

5.3 Check that spot is in center of field of view (superimposed with the narrow slits ± 0.5mm). If necessary, adjust as follows:

5.3.1 For vertical adjustment, use positioning screws (1, Figure 7-24) to adjust spot position.

5.3.2 For lateral adjustment, loosen screw (2, Figure 7-24), rotate micromanipulator assembly to adjust spot, then tighten screw.

5.4 Set spot size to 1000µm and microscope magnification to 32. Attach 1mm grid paper to fixation rod.

5.5 Visually verify 1000µm spot size using aiming beam and comparing its size to one of the 1mm square grides. If necessary, adjust as described in step 5.5.1.

5.5.1 Loosen single screw (1, Figure 7-25) at top of zoom and rotate SMA chimney until spot is the correct size. Tighten screw and add glyptol.

5.6 Remove fixation rod and attach 1mm grid to chinrest. Set zoom to 50µm.

5.7 Move joystick back and forth to focus and defocus slit. Verify that spot is smallest when slit is focused on target grid. If necessary, adjust as described in step 5.7.1.

5.7.1 Loosen set screw (3, Figure 7-24) and rotate lens (4) up or down to focus the spot on the target grid. Tighten set screw.

5.8 Spot Convergence: Observe spot on target grid. Check that spot remains within the same target square while changing the zoom from 1000µm to 50µm and all steps in between. If necessary, adjust as described in step 5.8.1.

5.8.1 Adjust flange: Set zoom to 1000µm setting. Loosen two recessed screws (2, Figure 7-25) on top of flange. Reposition flange to bring 1000µm spot to center. Set zoom to 50µm and check that spot is centered. Repeat adjustment as necessary until spot remains centered. Tighten screws.

5.9 After adjustments, replace fiber cover and tighten screws.

6 Perform the "Setting Terminal Efficiencies" procedure in Section Five of this manual.

7 Perform the EyeLite® Service Test Procedure.

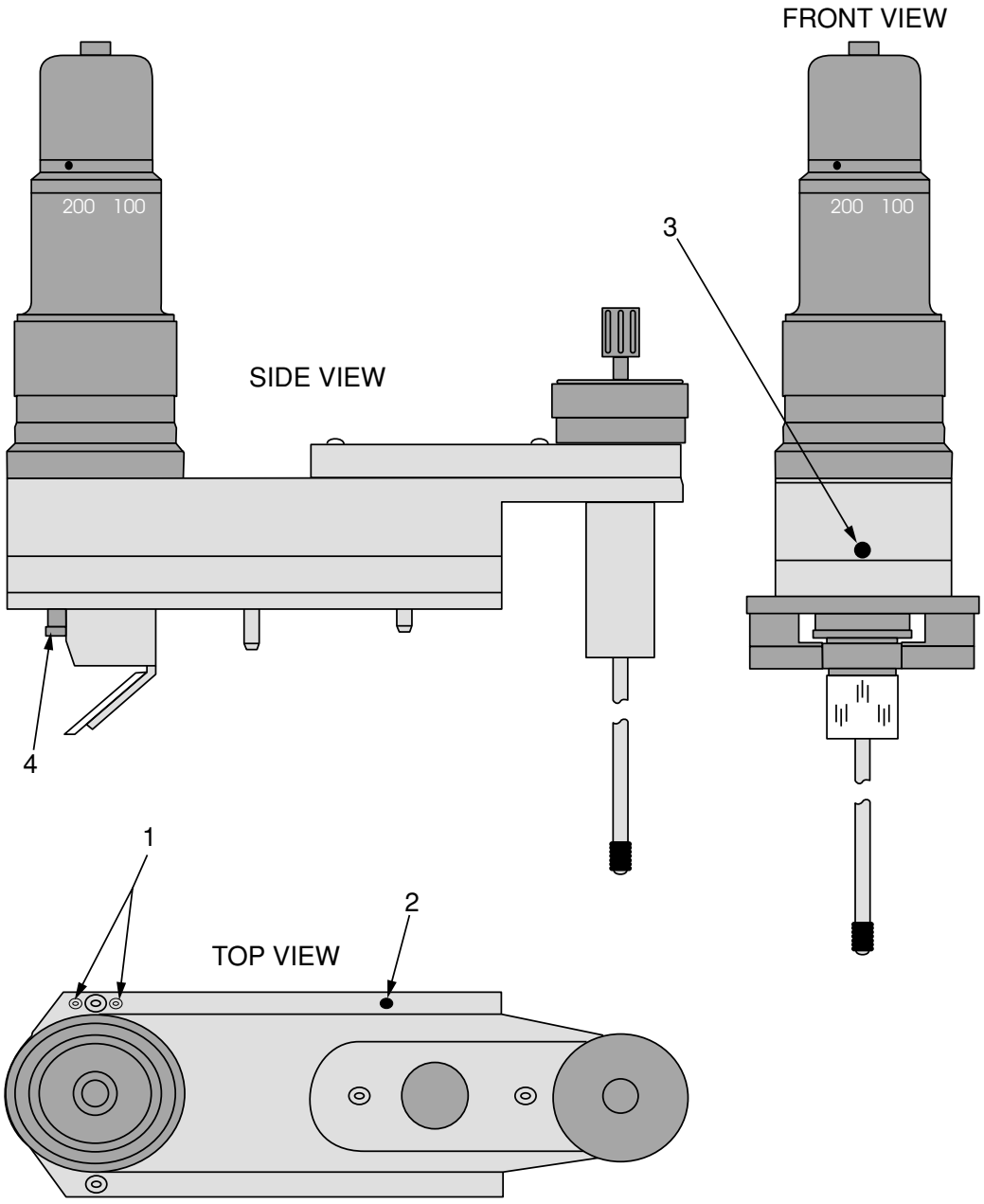


Figure 7-24
Zeiss SL130 Adaptation**

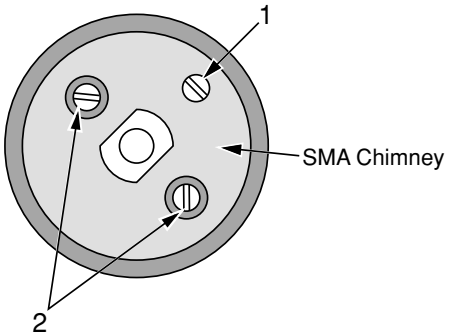


Figure 7-25
Adaptation Chimney with Fiber Cover Removed

KEELER LASER INDIRECT OPHTHALMOSCOPE (LIO)

The Laser Indirect Ophthalmoscope (LIO) is designed for use with the EyeLite®, and is composed of an illumination box and headpiece (see Figure 7-26). The treatment laser beam and aiming beam are both provided to the LIO from the EyeLite®. The laser beam power output depends on the laser source, and can be between 0.05 W and 2.0 W.

CAUTIONS

The LIO for the EyeLite® is factory configured for a single primary input voltage of either 110 V or 220 V. Changing from 110 V to 220 V (or conversely) is only possible by changing transformer inside instrument. This change shall only be performed by an authorized Alcon service technician.

Prior to connecting instrument to primary power supply, verify voltage indicated on instrument rear panel, under main power plug, is same as primary input voltage.

Check that LIO has the inscription "532 nM."

OPERATING PRINCIPLE

The LIO is connected to the EyeLite® with a fiber optic cable. This fiber optic cable delivers the treatment and aiming beams. Another fiber optic cable delivers white light from an illumination box. White light intensity is adjustable from approximately 1000 lux to 3000 lux.

The treatment laser beam, aiming beam, and illumination are made coaxial with a set of mirrors on the headpiece. A doctor's filter protects the surgeon against incidental laser beam reflections.

WARNING!

All staff in operating room must wear protective goggles, with a minimum optical density O.D. 4.0 (diffused viewing only) and O.D. 5.0 (maintenance and service) to filter 532nm and 1064 nm laser light.

FIBER CONNECTION

Connection of the LIO to the EyeLite® does not require any adjustment to the laser itself and can therefore be performed by the operator.

The laser fiber exiting the LIO headpiece must be connected to the EyeLite® terminal output and the LIO terminal selection must be made.

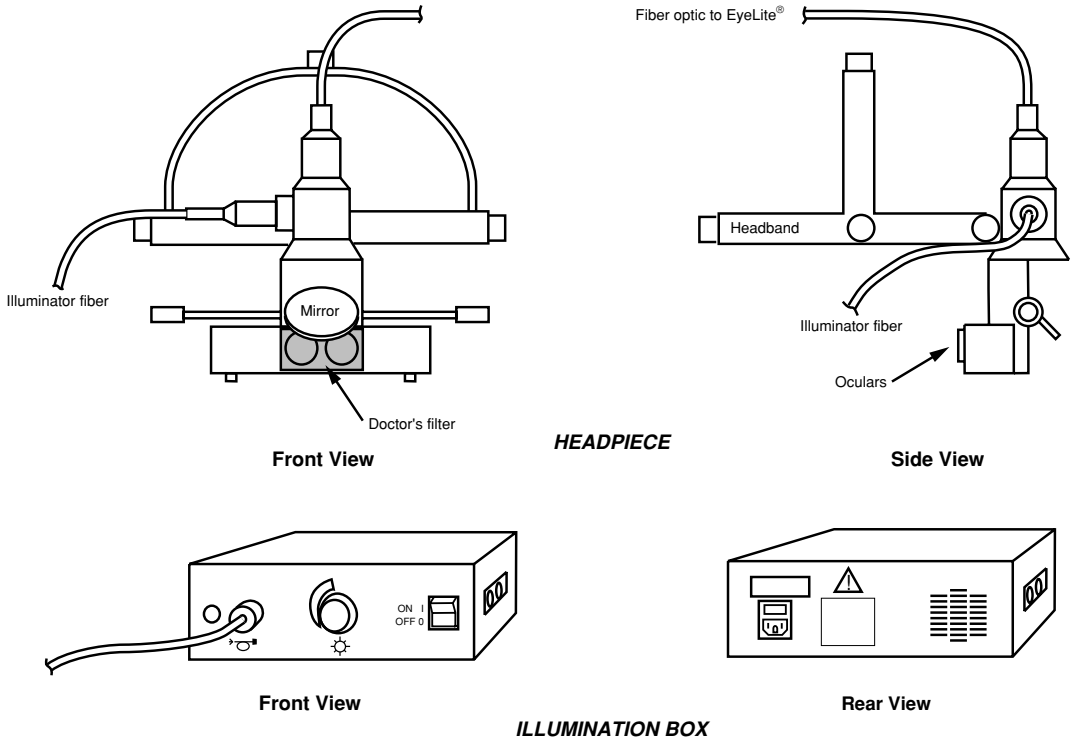


Figure 7-26
The Keeler Laser Indirect Ophthalmoscope

INSTALLATION

1 Connect the Illumination fiber optic to the illumination source. Connect the other end to the LIO headset (Do not tighten yet).

2 Turn on the illumination source and direct the output of the headset towards the wall at a distance of approximately 1 meter.

3 Gently insert the illumination fiber optic completely. The image on the wall will have a honeycombed look (see Figure 7-27). Slowly pull the cable out, while observing the image on the wall, until the light spot is uniform. Tighten setscrew.

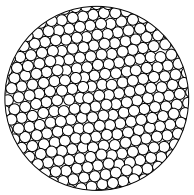


Figure 7-27
Honeycombed Illumination Image

NOTE: If you pull the cable out too far, the image will deteriorate starting from the outside and working in towards the center.

4 Remove the cover from the top of the Headset. Feed the fiber optic cable from the EyeLite® through the cover.

5 Connect the fiber optic cable from the EyeLite® to the headset, and install the cover.

6 Perform the Setting of the Terminal Efficiencies as outlined in chapter 5.

MAINTENANCE

This section is designed to inform the user of basic maintenance on the instrument.

Visual Inspection
The condition of system hardware components must periodically be checked to ensure correct system operation. Damaged hardware must be replaced.

- Chassis appearance.
- Operation of controls and indicators.
- Condition of fibers and connecting cables.

Clean Lenses and Mirrors
The LIO mirrors and lenses must be kept clean and cannot be scratched. Cleaning lenses requires special care and material:

- standard lens cleaning paper.
- spectrographic quality alcohol.

Paper must only be slightly moistened with alcohol. Stroke mirror and lens surfaces only once from one end to the other. Cleaning paper must only be used once.

Change Bulb in Illumination Box

1 Turn ON/OFF (I/0) switch to the OFF (0) position.

2 Disconnect power cord from power source.

3 Slightly loosen four screws (two on right and two on left) until side plates tilt out and release upper cover. Remove the upper cover.

4 Lift air duct covering bulb up and out of illumination box.

WARNING!
Air duct covering bulb may be hot and can burn your fingers.

CAUTION

Never turn the illumination box on without the light cover in place. The light generator will be destroyed.

5 Unplug bulb.

WARNING!
Do not touch bulb directly with your fingers; it can be extremely hot.

6 Plug new bulb into socket (24 V, 150W, Oshram H64642).

CAUTION

Do not touch bulb directly with fingers. Oil from fingers can dramatically reduce bulb life. Hold bulb with packing bag.

7 Replace air duct. Replace upper cover and tighten screws.

Calibration of LIO
The LIO is factory aligned. LIO terminal calibration is described in section five of this manual.

ALCON LASER INDIRECT OPHTHALMOSCOPE (LIO)

INTRODUCTION

The Alcon Laser Indirect Ophthalmoscope (LIO) is an accessory for use exclusively with the EyeLite®. The Alcon LIO is composed of a Heine diagnostic headset with integral laser delivery adaptation and an illumination power supply. The treatment laser beam and the aiming beam are both provided by the EyeLite®. The operating laser beam output power can be adjusted between 0.10W and 1.7W (minimum).

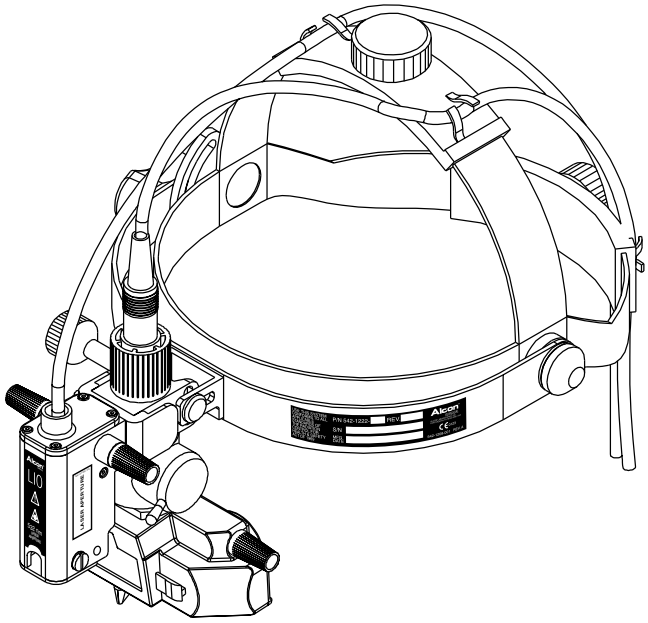


Figure 7-28
The Alcon Laser Indirect Opthalmoscope

The LIO is connected to the EyeLite® via a fiber optic cable. The LIO headset Illuminator is powered by either a standard desktop power supply or an optional portable battery operated power supply. Prior to connecting the primary power supply, ensure the voltage indicated on the power supply label is the same as the main power outlet. The illumination light is adjustable from approximately 0 to 1000 lux (500 lux for portable) using the illumination control knob on the power supply.

A permanent doctor's filter protects the surgeon against incidental laser beam reflections. The operator will have a colored view through the doctor's filter due to blocking of the 532 nm wavelength (green).

POWER SUPPLIES

For information on desktop (Heine EN 20-1) and portable (Heine Accubox II) power supplies refer to the documentation provided with the power supplies.

Adjusting the Output Voltage of the EN20-1 Desktop Power Supply

1 Remove power supply from container.

2 Remove four screws from bottom of power supply and remove top cover.

3 Plug power supply into an outlet, and connect illuminator power cord from headset to port on front of power supply.

4 Connect a DVM or equivalent to center of the port (inside power supply) and ground. See Figure 7-29.

5 Turn power supply on and increase intensity to maximum value (10).

6 Adjust potentiometer to achieve a 6.5 VAC reading on the meter.

7 Turn off power supply, remove DVM and illuminator power cord, and replace top cover of power supply.

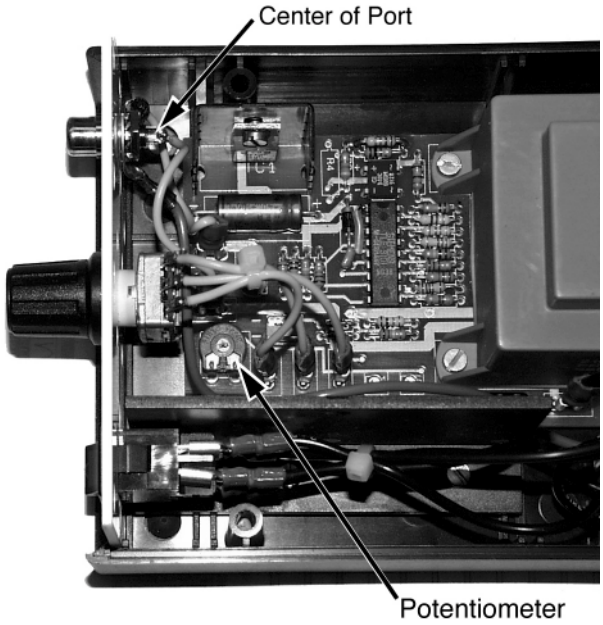


Figure 7-29
DVM Connection Point on EN20-1 Desktop Power Supply

CONNECTING THE ALCON LIO TO THE EYELITE®

1 Connect the laser fiber from the LIO termination to the Laser Aperture connector on the EyeLite® front panel.

2 Attach the power cord from the LIO to your power supply (see Heine EN 20-1 or Heine Accubox II documentation) and switch on illumination. **Note: Use the extension power cord for the Heine EN20-1 desktop power supply.**

ALCON LIO MAINTENANCE

This section of the manual is designed to inform the operator of basic care and maintenance of the instrument. If a problem occurs on the instrument, call the Alcon Technical Services department and give details of the breakdown circumstances and effects. From these elements, a technician will evaluate the problem and determine the maintenance requirements.

WARNING!

Maintenance on any part of the laser system must be performed with the laser off and the main power plug disconnected.

Checking the System Appearance

The condition of the system hardware components must be checked periodically to identify any fault which might cause incorrect operation of the system.

- Chassis appearance
- Operation of controls and indicators
- State of the fibers and connecting cables
- Check permanent Doctor's filter for damages or scratches

Any damaged hardware must be replaced. Contact your Alcon Technical Service representative.

Mirror and Lens Cleaning

The mirrors and lenses of the LIO headpiece must be kept clean and unscratched. Cleaning them requires special care and the following materials:

- Standard lens cleaning paper
- Methanol of spectrographic quality.

The following tips will aid you in cleaning the optics:

- Use each piece of cleaning paper only once.
- Move the cleaning paper across the optic surface from one end to the other in one continuous motion. Discard the cleaning paper and use a new piece for the next cleaning pass.
- Do not use a back and forth rubbing motion on the optic surface.

CAUTION

Care and cleaning operations must be performed with the instrument turned off and power disconnected. Use only optical quality paper and spectroscopic quality methanol when cleaning the mirrors and lenses, otherwise the optics could be scratched and their coatings destroyed.

Headset care and maintenance

- The eyepieces and the glass in front of the binocular assembly can be cleaned with a soft cloth (dipped in alcohol if necessary).
- The cushions for forehead, and nape can be removed for wiping with soapy water.
- The rest of the instrument can be cleaned with a soft cloth dipped in alcohol. Under no circumstances should cleaning fluids be used.

LIO LASER ADAPTATION ADJUSTMENT

Spot Size Adjustment

1 Remove LIO adaptation top fiber cover and connect laser fiber to headset.

2 Place grid paper 300 mm from the reflecting mirror as shown in figure 7-30.

3 Adjust the fiber chimney up and down to obtain 1 mm size spot at 300 mm. The diameter of the spot must be between 850 and 1150 µm at 300 mm. Secure chimney movement by tightening the three set screws in the LIO body.

4 Turn the illumination beam on and set the illumination spot size to the medium size. Set the illumination spot to the middle of its travel.

5 Adjust the position of the grid paper until the illumination spot is approximately 30mm. Use target to set laser spot. Verify that the aiming beam is centered in the horizontal direction of the illumination spot. If not, use the three setscrews to adjust/center the aiming beam within the illumination spot (see Figure 7-31).

6 Ensure that the aiming beam spot size diameter is still 850 to 1150 µm at 300 mm.

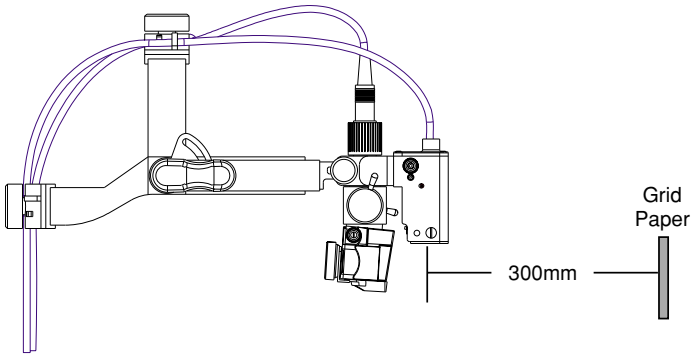


Figure 7-30
Position Grid Paper 300mm from Alcon LIO Reflecting Mirror

Aiming beam travel adjustment

7 Put the headset on your head and adjust as necessary so that the LIO fits properly.

8 Adjust the ocular so that the interpupil distance is correct.

9 Set the illumination spot size to the largest spot setting and position the illumination spot to the center of your field of view.

10 Rotate the LIO laser mirror knob. The aiming beam spot should move up and down, and be centered in the illumination spot. If not, adjust the aiming mirror adjustment screw shown in Figure 7-31 to center this vertical motion. Secure screw movement with Glyptal.

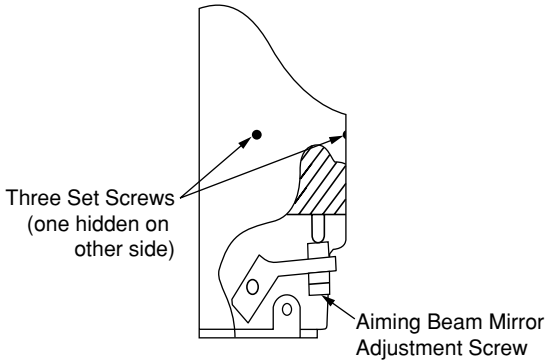


Figure 7-31
Aiming Mirror Adjustment Screw

Changing The Illumination Bulb

1 Ensure that power supply switches on the EyeLite® and illuminator power supply are in the OFF (O) position.

2 Disconnect power cord from power source.

3 Pull the Cord Socket away from the Bulb Connector (see Figure 7-32).

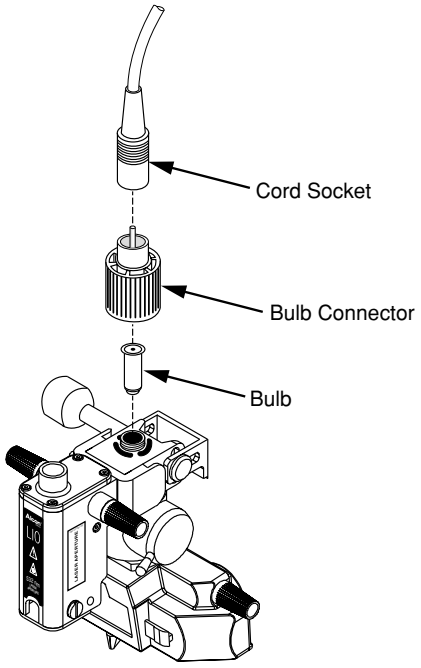


Figure 7-32
Alcon LIO Bulb Replacement

4 Unscrew and remove the Bulb Connector and pull the Bulb out of the socket.

WARNING!

The bulb connector and the bulb itself may be hot and can burn your fingers.

CAUTION

Do not touch the glass part of the bulb directly with your fingers. Oil from fingers can dramatically reduce bulb life.

5 Clean the new Bulb with a soft, clean cloth.

6 Insert the new Bulb so that the Bulb locating pin engages in the slit in the housing.

7 Rest the Bulb Connector on the base of the Bulb and screw in firmly.

8 Re-connect the Cord Socket.

Alcon LIO Spare Parts Numbers

Bulb 6V- (P/N: 542-1119-001)
6V NiCd battery for Accubox II (P/N 542-1207-001)
Clip (P/N: 9QF455011)
Power Extension Cable (P/N 542-1204-001)

Alcon LIO Accessories

20 D Lens (301-334)

EYELITE® to 3000LE BRIDGE

The EyeLite® to 3000LE Bridge allows both the EyeLite® and 3000LE lasers to use the same 3000LE slit lamp for patient treatments. This is done by connecting the EyeLite® laser beam fiber and interconnect cable to the 3000LE with a special adaptation. When installed, the operator only needs to slide a bridge on the adaptation left or right to treat the patient with an EyeLite® or 3000LE laser beam.

NOTE: This modification is designed only for 3000LE systems with version 2.2 software or higher. If necessary, install the proper software prior to installing the bridge.

INSTALLATION

Installation of the bridge requires the EyeLite® to 3000LE Bridge Adaptation kit. This kit consists of the following parts:

- Slit generator assembly
- Zoom/bridge assembly
- Interface plate
- Micromanipulator control bar
- Doctor's Filter assembly
- Fixation lamp assembly
- Miscellaneous hardware
- Bridge Cable Assembly
- Head rest strap (CSO only)

Refer to Figure 7-33 for parts location.

1 Install Slit Generator Assembly

1.1 Grasp slit tower on 3000LE slit lamp and turn counter clockwise (CCW) until it disconnects

1.2 Remove slit generator from kit and screw it clockwise into the hole where the slit tower was removed.

1.3 Find focal plane as detailed in the 3000LE Service Manual, Slit Lamp Optical Test section.

1.4 Adjust aiming beam to one point, if necessary.

1.5 Using a narrow setting center the slits (vertical position) on the aiming beam. If necessary adjust using the following:

1.5.1 Cover the top mirror of the split prism and using the two screws on the bottom mirror move the slit until it is centered on the aiming beam.

1.5.2 Cover the lower mirror and using one of the screws on the left or right side of the top mirror, center the slit on the aiming beam.

1.6 Rotate slits to the horizontal position and center slits on the aiming beam. If necessary adjust using the following

1.6.1 Cover the top mirror and loosen the screws on each side of the bottom mirror. Rotate the mirror until the slit is in the center of the aiming beam.

1.6.2 Cover the bottom mirror and adjust the four screws on top of the split prism to until the slit is centered on the aiming beam.

1.7 Perform the 3000LE YAG treatment bam alignment as described in the 3000LE service manual.

2 Install Zoom/Bridge Assembly

2.1 Remove interface plate from kit and mount on top of 3000LE slit lamp; make sure alignment pin on plate is correctly oriented to the hole in the top of the slit lamp. Secure plate with one M3X8 round-head allen screw provided in kit.

2.2 Remove zoom/bridge assembly from kit and mount on top of interface plate. Secure with two M3X8 allen screws provided in the kit's hardware package.

2.3 While lifting up on locking knob, slide bridge left or right and release knob. Knob should snap down into locking position and prevent the bridge from moving. Verify that bridge slides smoothly.

2.4 Remove micromanipulator bar from kit and insert into micromanipulator. Secure bar with two setscrews.

3 Install Doctor's Filter Assembly

3.1 Loosen thumb screw on top of 3000LE binocular housing and remove binoculars from slit lamp.

3.2 Remove Doctor's Filter from kit, and with thumbscrew pointing up insert into binocular housing. Secure Doctor's Filter by tightening thumb screw on top of binocular housing.

3.3 Insert binoculars into Doctor's Filter and secure with thumb screw on top of Doctor's Filter. Lightly tighten two setscrews on the bottom of Doctor's Filter, then loosen thumb screw and try to remove binoculars. If Doctor's Filter cannot be removed, slightly loosen setscrews until you succeed, then secure binoculars with thumbscrew.

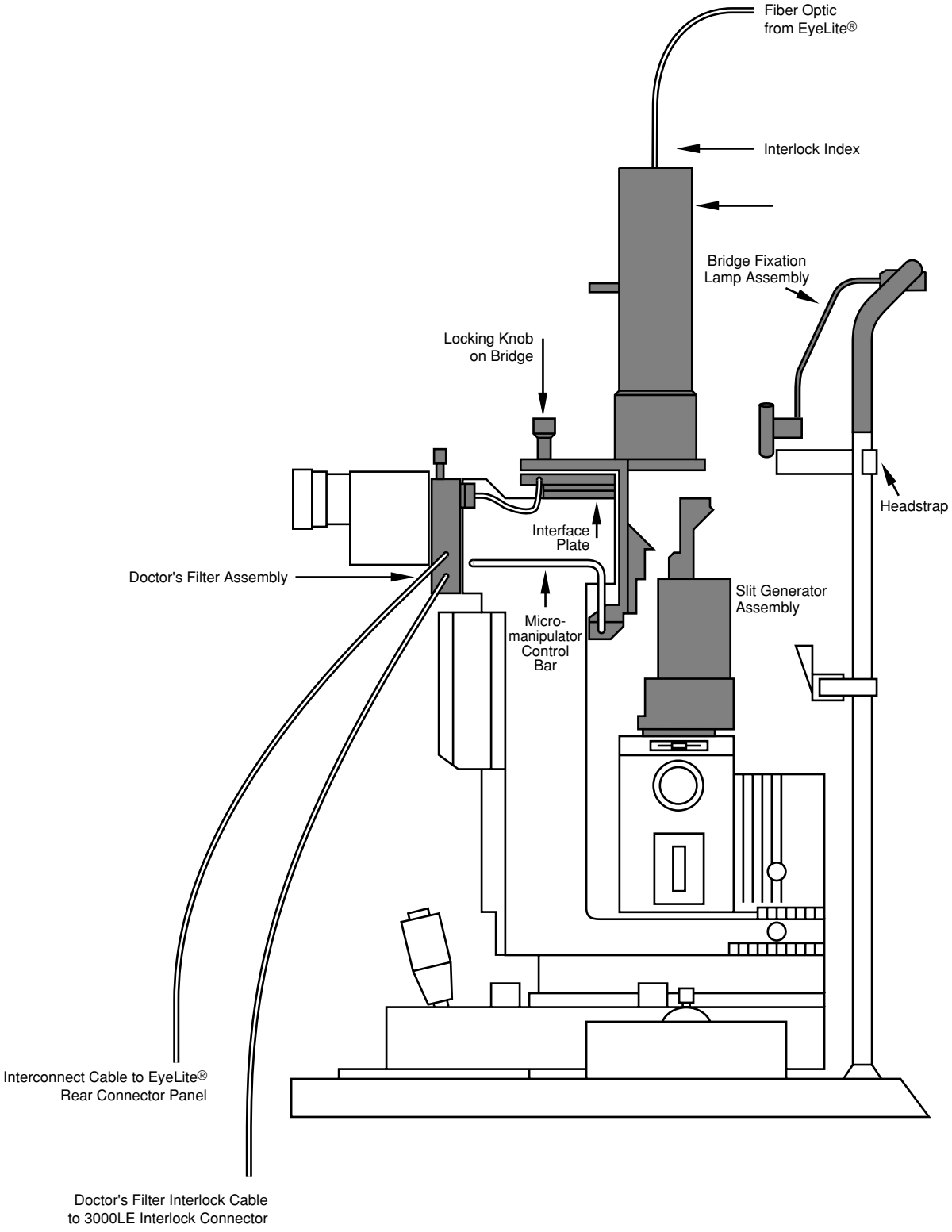


Figure 7-33
EyeLite® to 3000LE Bridge

4 Install Bridge Fixation Lamp Assembly

4.1 Remove 3000LE Fixation Lamp Assembly

4.1.1 **Nikon** - Remove one custom bolt and one phillips screw from each end of 3000LE fixation lamp bar (see Figure 7-34).
CSO - Remove two screws from each end of 3000LE fixation lamp bar (at top of chin rest assembly).

4.1.2 Lift bar off chin rest assembly, and while lifting bar to its full extension:
Nikon - cut the white, black, and green wires on slit lamp, as close as possible to bar.
CSO - two grey wires on the CSO slit lamp, as close as possible to bar.

4.2 Install Bridge Fixation Lamp

4.2.1 Slip heat shrink tubing over the wires emerging from 3000LE chin rest assembly and solder wires as follows. After soldering, apply heat to shrink the tubing over connections.

3000LE Nikon	3000LE CSO		Bridge Fixation Lamp
black	grey	to	black
white	grey	to	red
green	striated	to	(not used)

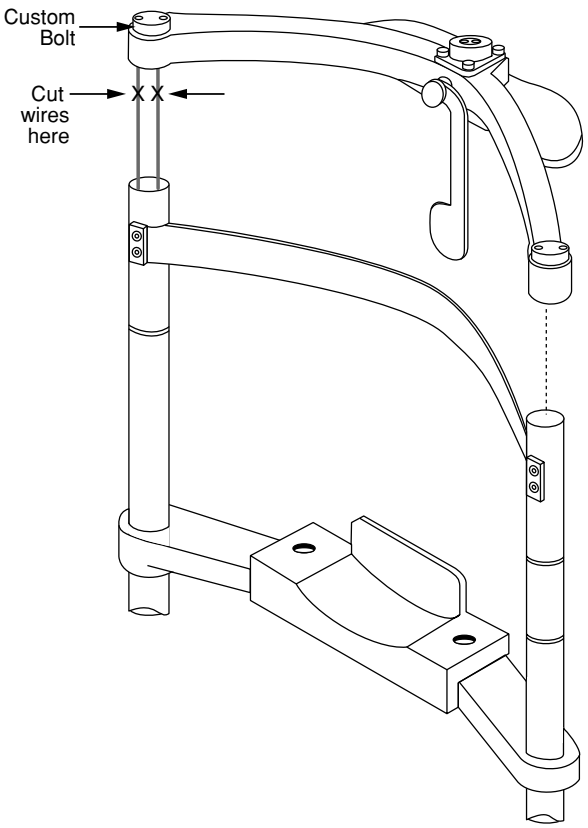


Figure 7-34
3000LE Fixation Lamp Removal

4.2.2 **CSO** - Remove the bottom cover of the 3000LE. Loosen the retaining nut that secures the chin rest bar. Rotate the chin rest bar until the screw holes at the top are facing the front of the 3000LE.

Nikon and **CSO** - Mount the new bridge fixation lamp on the chin rest assembly and secure with two screws removed in step 4.1.1.

4.2.3 **CSO** - Tighten the retaining nuts for the chin rest assembly and attach the bottom cover of the 3000LE.

4.2.4 **CSO** - Install the new head strap retaining clamps and head strap (see Figure 7-35).

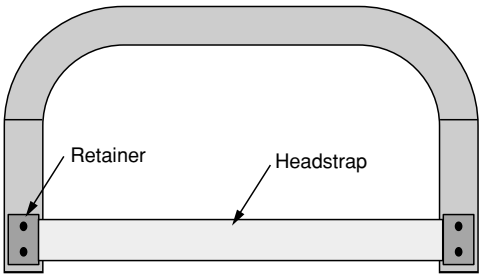


Figure 7-35
CSO Headstrap Installation

5 Connect Cables

5.1 Connect fiber optic from EyeLite® terminal to top of 3000LE zoom assembly.

5.2 Connect cable from sliding bridge to Doctor's Filter.

5.3 Connect interconnect cable from Doctor's Filter to EyeLite® rear panel.

6 Connect Doctor's Filter Interlock Cable.

6.1 ***For 3000LE with version 2.2 software:***

a. Disconnect interlock connector from base of the 3000LE.

b. Disassemble interlock connector (see Figure 7-36), then count the number of pins in the connector (there are either 2 or 3 connector pins).

c. Remove any jumpers that may exist between the connector pins.

For 3000LE with version 3.2 software:

a. Disconnect the footswitch connecter from the base of the 3000LE and remove jumper between pins 1 and 3.

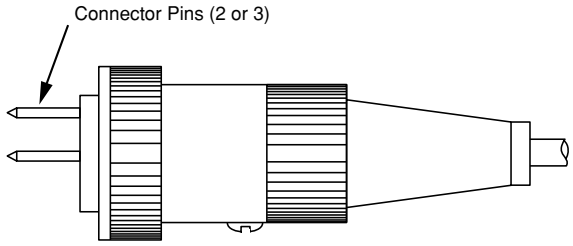


Figure 7-36
Interlock Connector on Base of 3000LE®

6.2 Remove bridge cable assembly from the miscellaneous hardware kit. Dissassemble the bridge connector (see Figure 7-37).

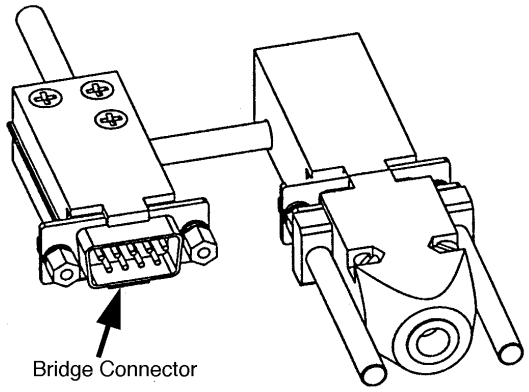


Figure 7-37
Bridge Cable Assembly

6.3 Slip heat shrink tubing over black and red wires, then solder wires to interlock connector pins as outlined below. After soldering, apply heat to shrink the tubing over connections and assemble the connector.

For 3000LE with version 2.2 software:

If interlock connector has two pins:

a. solder red wire to pin 1.

b. solder black wire to pin 2.

If interlock connector has three pins:

a. jump pin 1 to pin 2.

b. solder red wire to pin 1.

c. solder black wire to pin 3.

For 3000LE with version 3.2 software:

a. On footswitch connector, solder red wire to pin 1.

b. solder black wire to pin 3

6.4 Assemble connectors and connect to INTERLOCK connector at base of 3000LE.

6.5 Connect Doctor's Filter interlock cable to bridge cable assembly.

7 Perform the Zeiss 30SL adaptation alignment as described in the beginning of this section of the manual.**

8 Perform EyeLite® and 3000LE checkout procedures.

MEDITEC LINK FOR ZEISS** AND HAAG-STREIT SLIT LAMPS

The Meditec Link upgrades an existing slit lamp to a laser photocoagulator without modifying the slit lamp. The link is equipped with a mechanically rotated doctor's filter.

The Meditec Link can be used to upgrade the following slit lamps.

- Haag-Streit 900 BQ
- Zeiss SL 120, SL 130, SL 160

MEDITEC LINK FOR ZEISS** SLIT LAMPS

The Meditec Link for Zeiss** slit lamps is shown in Figure 7-38.

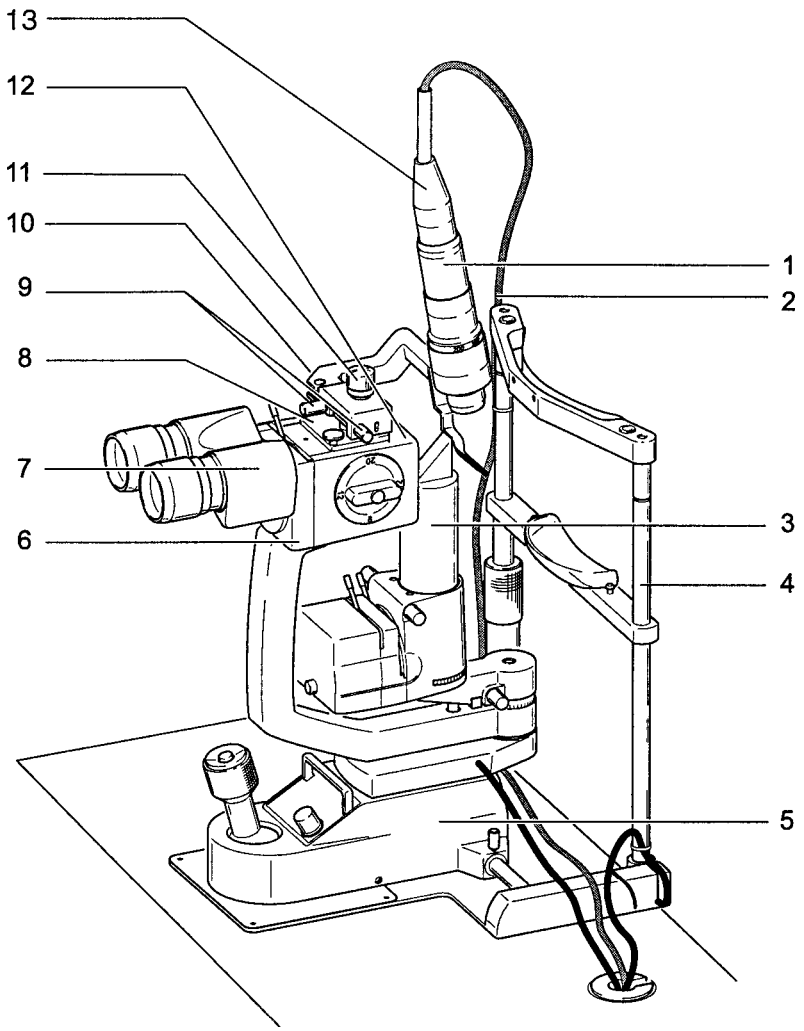
SPECIFICATIONS

Laser Connection
- 50µm fiber (NA 0.12) with SMA fiber connector
- Connector for Doctor's filter

Spot Size Adjustment
- Zoom optics for continuous spot size adjustment: 50µm to 800µm
- Imaging: 50µm to 400µm focusing
  > 400µm to 800µm defocusing

Doctor's Filter
- Mechanical, manually swiveled
- Filter disks: Protection type L5 (DIN EN 207) at 532nm electronically monitored (position sensor)

Size and Weight
- 13 x 22 x l3 cm (W x H x D)
- 0.7 kg



1 Meditec Vario-optics
2 Optical Fiber
3 Illuminating Optics
4 Headrest
5 Basic Slit Lamp: Zeiss SL 120
6 Doctor's Filter
7 Oculars
8 Adapter Plate
9 Horizontal Adjusting Screws
10 Lever for Rotating Link In and Out
11 Vertical Adjusting Screw
12 Microscope with Magnification Changer
13 Fiber Introducing Cap

Figure 7-38
Meditec Link for Zeiss Slit Lamps**

INSTALLATION

1 Verify that the following components are included in the kit:
- Case
- Meditec Vario-optics
- Adapter plate
- Doctor's filter
- Cable
- Cable clips
- Allen wrench
- Screwdriver
- Fiber cap
- Laser warning signs
- Fiber
- Target
- User's manual
- Medical device logbook

2 Secure adapter plate to the slit lamp (see Figure 7-39).

3 Loosen oculars set screw and remove oculars.

4 Place Doctor's filter on slit lamp with lever up. Secure by tightening set screw.

5 Place oculars on slit lamp and secure by tightening set screw.

6 Loosen the horizontal adjusting screws (9, Figure 7-38).

7 Place Meditec Vario-optics on the adapter plate and secure by tightening thumbscrew.

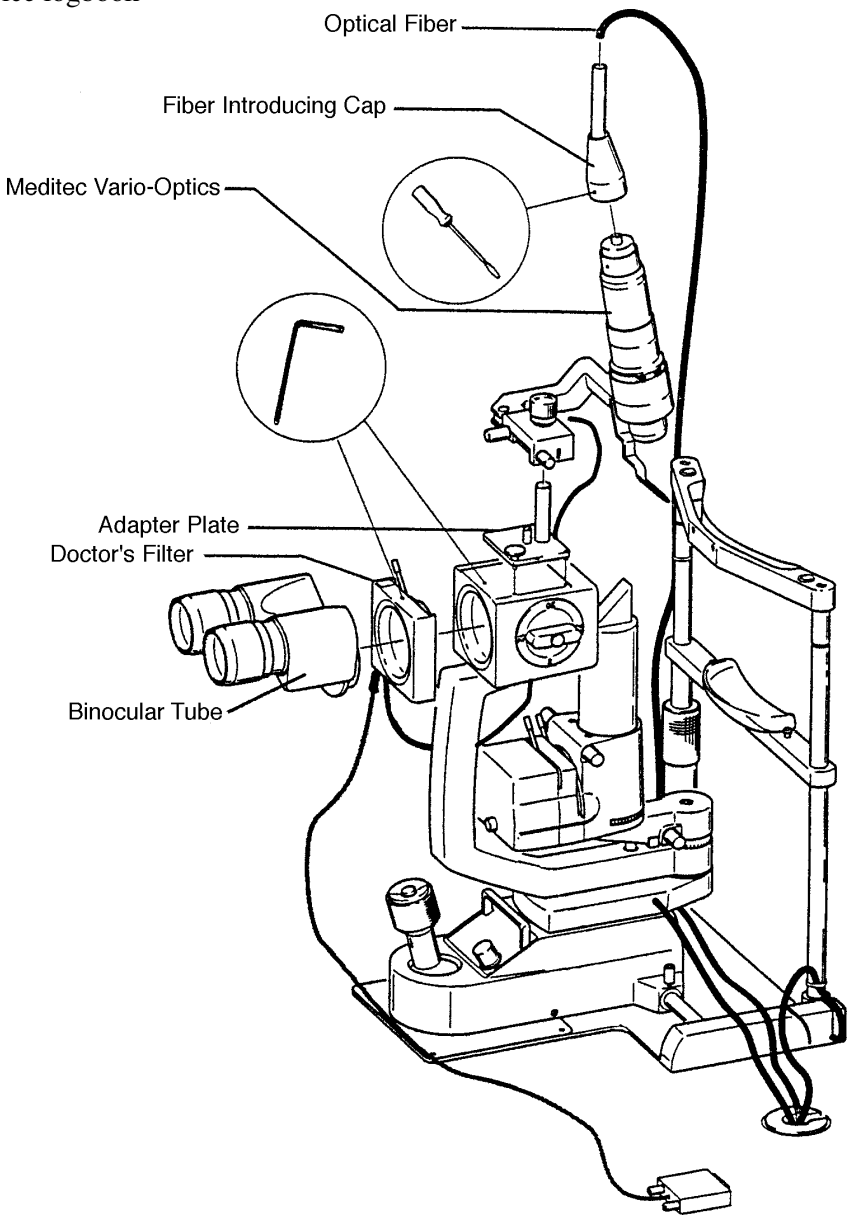


Figure 7-39
Installation of Meditec Link

8 Thread optical fiber through the Fiber Cap.

9 Remove protective caps from Vario-optics and fiber.

10 Attach optical fiber to Vario-optics.

11 Secure Fiber Cap to the Vario-optics using a screwdriver.

12 Release lever (10, Figure 7-38) and rotate the link to the left side.

13 Connect 3-pole cable from Doctor's filter to Vario-optics.

14 Connect 4-pole cable from Doctor's filter to the port marked "Dr.'s Filter" on backside of the EyeLite® or Eyelase green laser.

15 Use cable clips to secure the cable to the microscope carrier.

INITIAL ADJUSTMENT

1 Turn the slit lamp ON.

2 Turn the laser ON.

3 Attach target to headrest as shown in Figure 7-40. Make sure that the target is perpendicular to the direction of view.

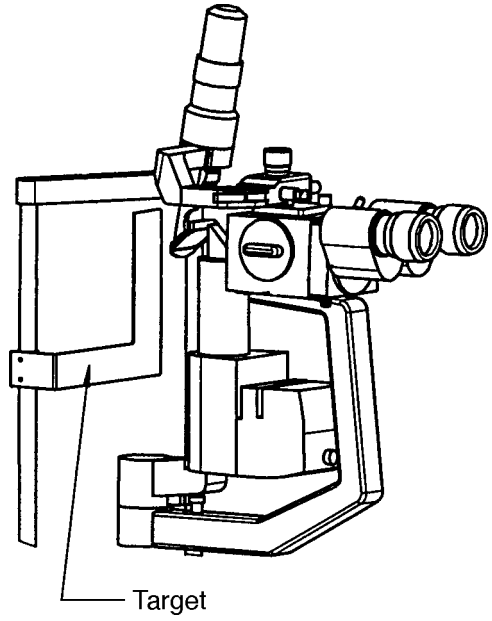


Figure 7-40
Mounting Target to Headrest

4 Focus on target using slit lamp's joystick.

5 Lock slit lamp in place.

6 Rotate Vario-optics into the optical path.

7 Set slit lamp illumination to smallest circle of light.

8 Look through the microscope and adjust the aiming beam as follows until it is in the center of the field of view and concentric to the slit image:

8.1 Adjust the aiming beam vertically by turning the vertical adjusting screw (11, Figure 7-38). If turning the screw counterclockwise, depress the area around the screw slightly to make sure that the aiming beam moves downwards.

8.2 Adjust the aiming beam horizontally by turning the adjusting screws (9) in opposite directions.

8.3 Lock the link by tightening both adjusting screws (9) simultaneously.

8.4 After locking the link, check the aiming beam position again. If it moved, loosen the horizontal adjustment screws (9) and repeat the procedure from step 8.1

9 Disconnect target from headrest.

RE - ADJUSTMENT

NOTE: Adjust oculars to correct any refractive error before starting the adjustment procedure.

Vertical Adjustment

If the vertical adjustment range is not symmetrical with respect to the center of the slit, proceed with the following steps.

1 Adjust two set screws on the optics holder (see Figure 7-41) until vertical adjustment range is symmetrical.

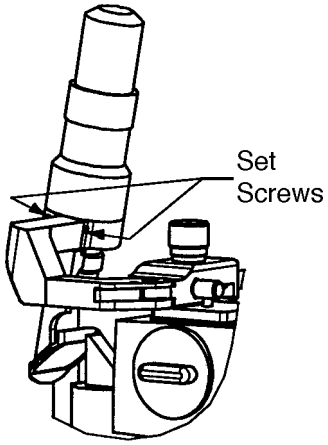


Figure 7-41
Location of Screws for Vertical Adjustment.

Elimination of Spot Travel

2 If the spot moves out while turning the Vario-optics through the full range of spot sizes, evenly tighten the three screws beside the SMA connector until the laser beam transmits the 50µm spot through focusing lens concentrically (see Figure 7-42).

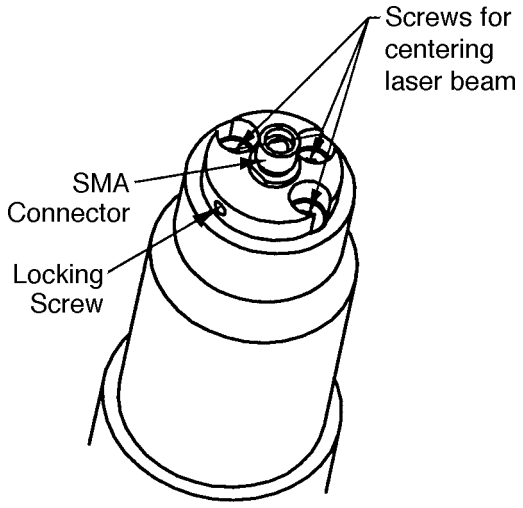


Figure 7-42
Adjusting the Vario-optics to Eliminate Spot Travel

3 While looking through the slit lamp microscope, note location of the 50µm spot and move center of the 100µm spot to this location by loosening one or two of the three screws.

4 Verify location of 50µm spot. If necessary, repeat the procedure.

Adjustment of Spot Size

5 Set spot size to 200µm.

6 Loosen the SMA connector by loosening the locking screw.

7 While looking through slit lamp microscope, carefully move connector until the spot is sharply delimited.

8 Secure SMA connector by tightening locking screw.

9 Set spot size to 50µm

10 Loosen the set screw on the focusing lens (see Figure 7-43). Turn lens until laser spot appears minimum and sharply delimited. Tighten set screw.

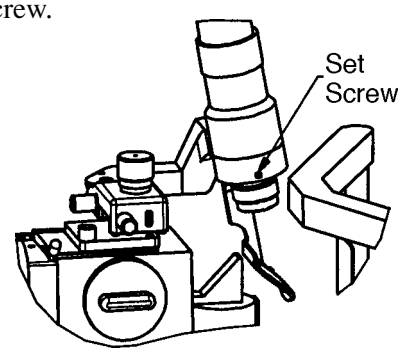


Figure 7-43
Adjusting the Spot Size

11 Check the 200µm and 1000µm spot size settings. If necessary, repeat the previous steps.

Alignment to Illumination Slit

12 Verify that the laser spot is in the slit center. If not, return to step 1.

MEDITEC LINK FOR HAAG-STREIT SLIT LAMPS

The Meditec Link for Haag-Streit slit lamps is shown in Figure 7-44.

SPECIFICATIONS

Laser Connection
- 50µm fiber (NA 0.12) with SMA fiber connector
- Connector for Doctor's filter

Spot Size Adjustment
- Zoom optics for continuous spot size adjustment: 50µm to 800µm
- Imaging: 50µm to 400µm focusing
  > 400µm to 800µm defocusing

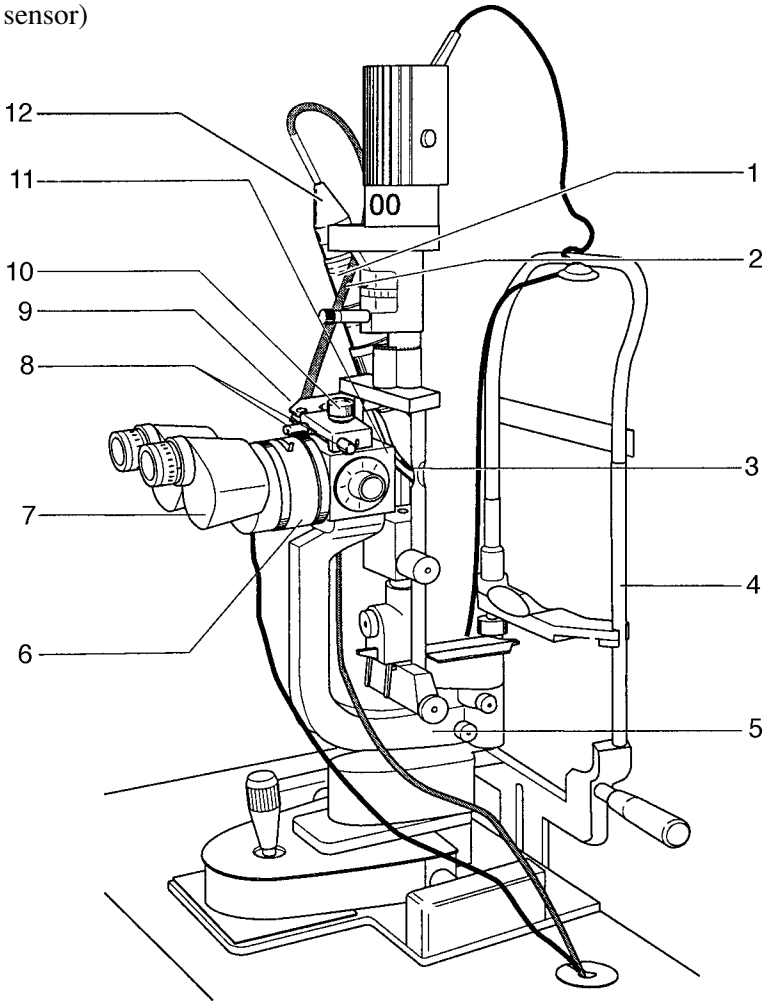
Doctor's Filter
- Mechanical, manually swiveled
- Filter disks: Protection type L5 (DIN EN 207) at 532nm electronically monitored (position sensor)

Size and Weight
- 14 x 22 x l7 cm (W x H x D)
- 0.7 kg

INSTALLATION

1 Verify that the following components are included with the kit:
- Case
- Meditec Vario-optics
- Adapter
- Doctor's Filter
- Cable
- Cable clips
- Screwdriver
- Fiber Cap
- Laser warning signs
- Fiber
- User's manual
- Medical device logbook

2 Rotate slit projector out to the right.



1 Meditec Vario-Optics
2 Optical Fiber
3 Reflecting Mirror
4 Headrest
5 Basic Slit Lamp Haag-Streit
6 Doctor's Filter
7 Oculars
8 Horizontal Adjusting Screws
9 Lever For Swinging the Link In and Out
10 Vertical Adjusting Screw
11 Microscope with Magnification Changer
12 Fiber Introducing Cap

Figure 7-44
Meditec Link for Haag-Streit Slit Lamps

3 Secure adapter plate to the slit lamp (see Figure 7-45).

4 Place Meditec Vario-optics on adapter plate and secure by tightening thumbscrew.

5 Rotate slit projector back in.

6 Loosen adjusting screws (9 and 11, Figure 7-44).

7 Loosen and remove oculars.

8 Place the Doctor's filter on the slit lamp with lever up and secure by tightening the set screw.

9 Replace oculars taking care to align the position marks. Secure oculars by tightening set screw.

10 Remove caps from Vario-optics and fiber.

11 Thread optical fiber through the Fiber Cap and attach optical fiber to Vario-optics.

12 Use a screwdriver to secure the Fiber Cap to the Vario-optics.

13 Connect 3-pole cable from the Doctor's filter to the Vario-optics.

14 Connect 4-pole cable from the Doctor's filter to the port marked "Dr.'s Filter" on backside of EyeLite® or Eyelase green laser.

15 Use cable clips to secure the cable to the microscope stand.

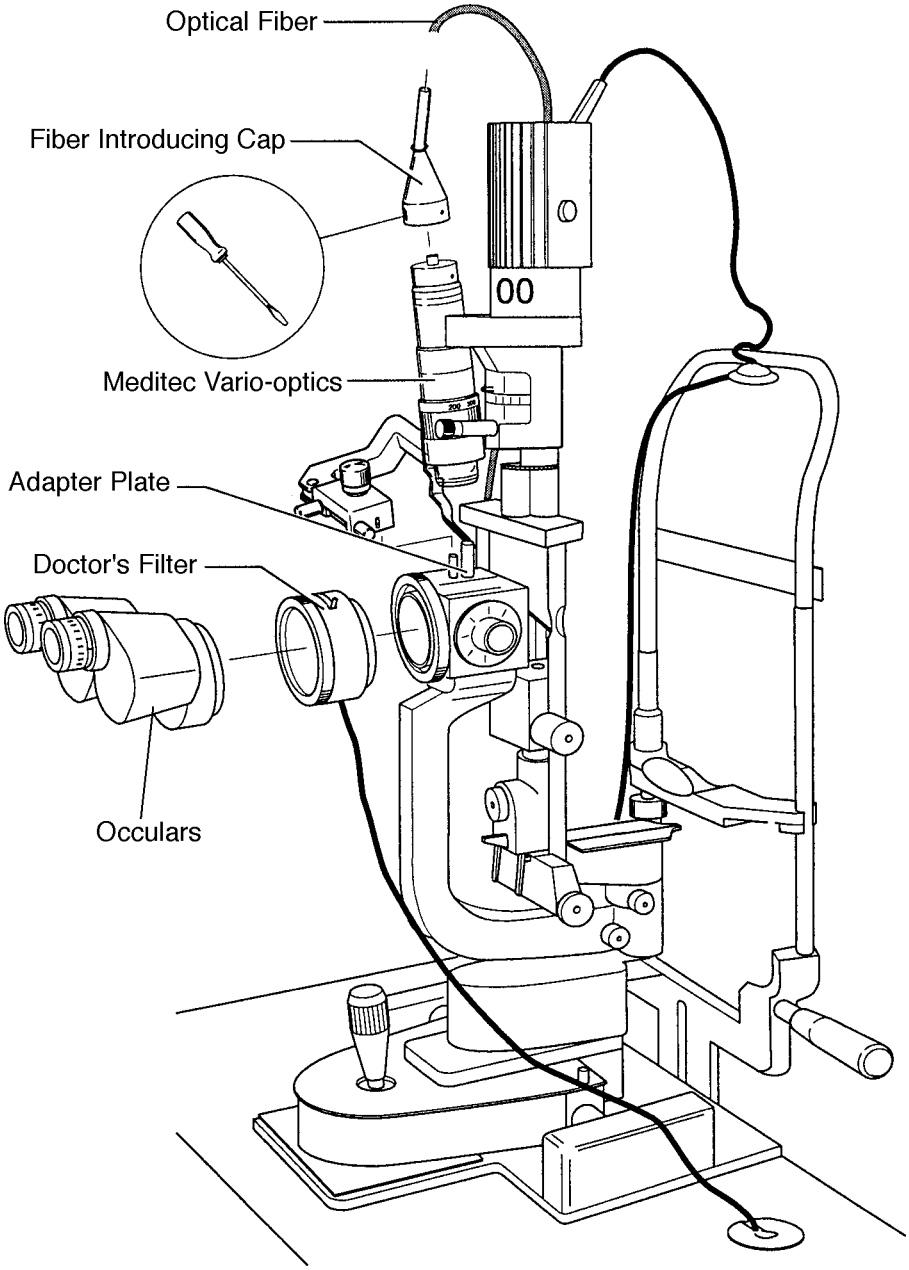


Figure 7-45
Installation of the Meditec Link on a Haag-Streit Slit Lamp

INITIAL ADJUSTMENT

1 Turn the slit lamp ON.

2 Turn the laser ON.

3 Install the focus rod on the slit lamp and turn it so its flat part is toward corneal microscope (see Figure 7-46).

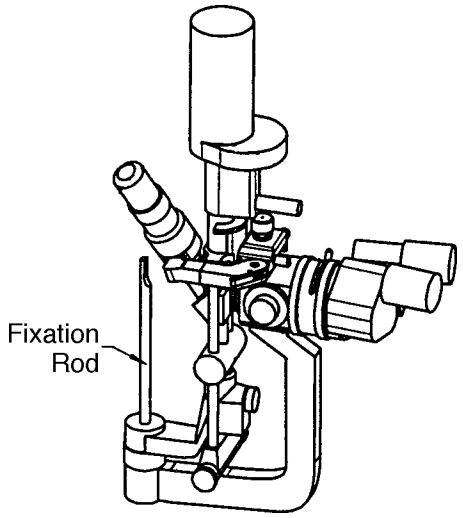


Figure 7-46
Position of Focus Rod on Slit Lamp

4 Rotate the Meditec Vario-optics into the optical path.

5 Set the slit lamp illumination to the smallest circle of light.

6 Look through the microscope and adjust the aiming beam as follows until it is in the center of the field of view and concentric to slit image:

6.1 Adjust the beam vertically by turning the vertical adjusting screw (11, Figure 7-44). If turning counterclockwise, depress the area around the screw slightly to make sure that the aiming beam moves downwards.

6.2 Adjust the beam horizontally by turning the horizontal adjusting screws (9) in opposite directions.

6.3 Lock the link by tightening both adjusting screws (9) simultaneously.

6.4 After locking the link, check the aiming beam position again. If it moved, loosen the horizontal adjustment screws (9) and repeat the procedure from step 6.1

7 Remove focus rod from slit lamp.

RE - ADJUSTMENT

NOTE: Adjust oculars to correct any refractive error before starting the adjustment procedure.

Vertical Adjustment
If the vertical adjustment range is not symmetrical with respect to the center of the slit proceed with the following steps.

1 Adjust the two set screws on the optics holder (see Figure 7-47) until the vertical adjustment range is symmetrical.

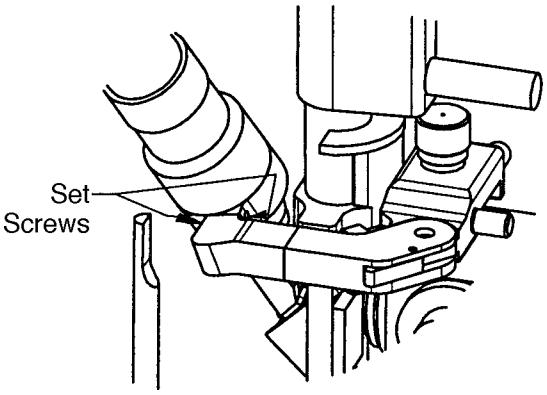


Figure 7-47
Location of Screws for Vertical Adjustment.

Elimination of Spot Travel

2 If the spot moves out while turning the Vario-optics through the full range of spot sizes, evenly tighten the three screws beside the SMA connector until the laser beam transmits the 50µm spot through focusing lens concentrically (see Figure 7-48).

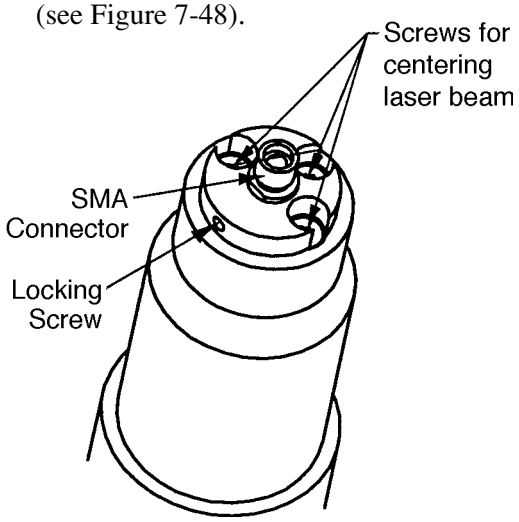


Figure 7-48
Adjusting the Vario-Optics to Eliminate Spot Travel

3 While looking through the slit lamp microscope, note location of the 50µm spot and move center of the 100µm spot to this location by loosening one or two of the three screws.

4 Verify location of the 50µm spot. If necessary, repeat the procedure.

Adjustment of Spot Size

5 Set spot size to 200µm.

6 Loosen SMA connector by loosening the locking screw.

7 While looking through the slit lamp microscope, carefully move connector until the spot is sharply delimited.

8 Secure the SMA connector by tightening the locking screw.

9 Set the spot size to 50µm

10 Loosen the set screw on the focusing lens (see Figure 7-49). Turn the lens until laser spot appears minimum and sharply delimited. Tighten set screw.

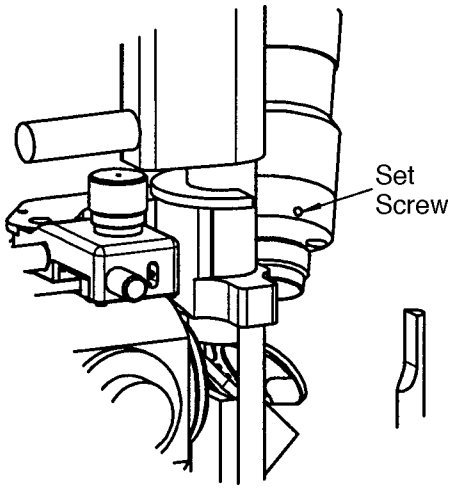


Figure 7-49
Adjusting the Spot Size

11 Check the 200µm and 1000µm spot size settings. If necessary, repeat the previous steps.

Alignment to Illumination Slit

12 Verify that the laser spot is in the slit center. If not, return to step 1.

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